COAL AGE

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Lessons Worth Learning

By Floyd W. Parsons

THE war has undoubtedly widened the outlook of all humanity; both labor and capital have gained in imagination. However, it appears now that mankind's social vision has outstripped mankind's ability to make the dreams materialize. Radicals throughout the world are taking advantage of the moment to preach an abandonment of the old order of things and an adoption of an entirely new order—or a lack of order.

It is perhaps fortunate for other nations that in Russia we see the spectacle of what happens under a government that holds forth the belief that wealth can be obtained by the individual without working. In Russia we see the dire consequences of a rule based on prejudice and class hatred. We now know what to expect of a government operating entirely for selfish benefit and having no thought of injury to others.

Bolshevism has revealed itself to an astonished world and is nothing more or less than a "starvation conspiracy." It is an administration of crushed skulls and bayoneted bodies. Not even in the Dark Ages, when humanity was emerging from a state of ignorance, was there a government equally as inhuman and unjust.

Here in America, even though an ocean separates us from the turbulent peoples of Europe, we are not safe in believing ourselves independent of the troubles abroad. The United States harbors many people, especially those of foreign origin, who do not realize that prosperity cannot be organized under a rule by class, whether that class be capitalistic or labor.

There is room in this country for an educational campaign that will teach loyal citizens to meet reason with reason, but at the same time to understand that force can be met only with force. There should be no further parleying with those who create disorders. Sympathy must be extended to the workers and to those who desire to work, for these are the ones who show good faith. Americans must be taught that the solidarity of the whole mass is superior to solidarity of the class. Class patriotism is a menace, while mass patriotism is sound and true.

The chief danger here in the United States lies in the fact that Americans may fail to distinguish between conditions that exist here and those that have existed, and still continue to prevail, in Russia, Germany and other countries. In these countries the people in destroying their governments got such momentum that they want to keep on going and wipe out institutions that are not a menace but part of their very lives. Thus they have attained to the other extreme and have brought about the elevation of labor over capital, which is no more to be desired in its extreme form than the order that existed before.

New ideas are always infectious. So it is not surprising that following the disorders in Russia and elsewhere some of the labor leaders in other countries have announced that what they are really after is not so much short hours and increased pay as a destruction of the whole capitalistic system. This was the talk in Seattle and down in Buenos Aires, where the workmen were enjoying record wages and still were so greedy that they did not hesitate to injure the whole cause of unionism, in order to gain a personal and purely local advantage.

Great danger lies in the present doctrines of foreign origin that are wholly ***unadapted to*** America. It is the duty of every citizen who loves this land of his birth or adoption to see that propaganda of an insidious nature gets no foothold here. It was inevitable that with the coming of unemployment we would get the radical agitators. However, there is no reason, even in these serious times, for our confusing ideas and ideals.

During the war labor and capital were cordial in their attitude one to the other. Now in these less favorable times we must place a firm heel on everything tending to create discord. Capital must bend every effort to maintain wages at the highest possible standard. On the other hand, the workmen must not forget that the cost of earning a dollar can never for any length of time be more than the dollar itself. Above all else, the workingman today must think for himself. In too many cases the rank and file do not oppose extreme views, even when they are clearly unjust. Never has America had such an opportunity to lead the world as it has today. All that is needed is sound sense on the part of individuals and confidence on the part of all classes in their dealings with each other.

Use of Lignite, Bagasse and Wood Waste for Power Generation and Heating

By John B. C. Kershaw
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SYNOPSIS — *There are immense deposits of lignite in the United States, Canada, Australasia, and other parts of the world, the development and utilization of which are of great interest. The four principal methods of using this fuel are here described in detail; they include air drying and use in the natural state for power generation; briquetting; distillation and gasification. Various plants in this country and in Europe are described. Note is made of the properties of bagasse and the methods of burning it; also the method of using wood and sawmill refuse.*

THE work of the U. S. Geological Survey has revealed the existence of very large areas of lignite in North Dakota, Montana, Wyoming, Colorado and Texas. In the first-named state, it is estimated that the deposits cover 32,000 square miles of territory, and are capable of producing several hundred billion tons of brown coal. According to reliable authority, there are also vast deposits of lignite in Alberta, Saskatchewan and Manitoba, in the Dominion of Canada, and 1700 square miles in Australasia. The total world deposits of this fuel, consequently, are probably equal to those of the other and deeper-lying coal measures.

The developments that are now occurring in the use of lignite are therefore worth studying, in connection with the better utilization of the fuel resources of the world; the following résumé of all recent articles and publications upon the subject, especially of those dealing with American practice, ought to prove of interest and value to readers of *Coal Age*.

Lignite is a fuel intermediate to peat and ordinary bituminous coal as to age and also in respect to chemical properties. The percentage of water in freshly mined lignite is large, ranging from 30 to 50 per cent., and even after air-drying, the moisture content is still quite high, and varies from 10 to 20 per cent. When large lumps of lignite are dried rapidly, the escape of the excessive moisture causes them to break up into small pieces; this crepitation of course detracts from the value of lignite as a fuel, except after briquetting or other treatment. The ash content varies from 5 to 10 per cent. and the volatile hydrocarbons from 35 to 45 per cent.

Four methods of utilizing lignite are in operation in different parts of the world: (1) Air-drying and use in the natural state for power-generation; (2) briquetting; (3) distillation; (4) gasification. The most notable examples of these four different methods of use will now be described.

Power Generation from Air-Dried Lignite — The electro-chemical works at Bitterfeld, in Saxony, are operated entirely with electric power derived from the extensive beds of lignite which occur in the vicinity. In fact, the site of these works was purposely chosen by the promoters because it was believed that the cheapness of the power would more than counterbalance the distance of the works from the usual markets for the manufactured goods. These works are an offshoot from the original German electrolytic soda works, at Griesheim, near Frankfort, operating what is known as the "Elektron" process of soda and bleach manufacture. The fact that these Bitterfeld works have been greatly extended since their erection in 1894, when the plant was designed for the utilization of only 3000 hp., proves that the successful production of electric power from lignite was quite possible, even under the pre-war conditions of competition with power derived from coal and water.

Few details of these interesting works, or of the power plant, have been allowed to appear in print. It

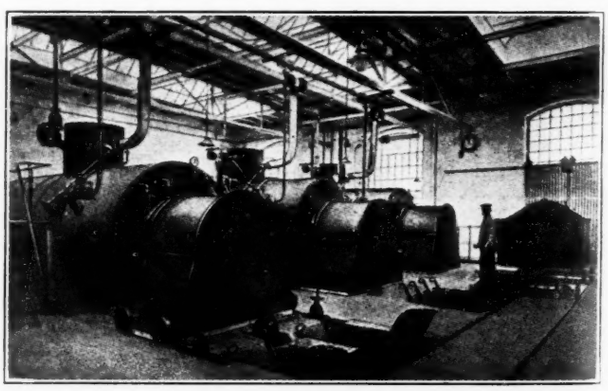


FIG. 1. GENERAL VIEW OF BOILERS FOR BURNING LIGNITE IN GERMANY

is known, however, that the lignite is cut from the beds in which it is found by mechanical cutters or shovels; it is subjected to a certain amount of air-drying, and is then carried to the works by aerial transportation. No official figures showing the actual results obtained at the power plant have been published. A German paper[1], however, in 1908 published an illustrated description and tests of an installation of four tubular boilers with step grates specially designed for operation with lignite; some details of this plant are given here, for no doubt the Bitterfeld power plant is similar in many respects.

Figs. 1 and 2 show a general view of the charging floor of the boilers, and also a sectional elevation of the grate. The latter, it will be seen, is sunk below the floor level, and the lignite is dumped directly into the charging hoppers from the cars in which it is brought into the boiler house. A sliding door, divided into three sections, regulates the admission of the fuel to the grate of each furnace. The angle of the step grate can be altered from the ground level. The lower

[1] "Zeitschrift Vereines Deutscher Ingenieure," Vol. 52, Feb. 15, 1908.

part of the grate is horizontal, and the combustion of the partly consumed fuel is completed here. The ashes are then allowed to fall into inclosed ash boxes by drawing a horizontal damper; from these they are discharged into small cars running on a track below the step grate. The admission of air during the discharge of the ashes is prevented by this system of removal. The whole of the lower part of the step grate is inclosed, and the admission of air to the grate is regulated by the levers, which open or close the doors in front of the space under the furnace. The air required for combustion is drawn through a system of pre-heating stoves and as the use of the step grate causes the gradual evolution of the gaseous matter of the fuel, little or no smoke is produced. A secondary air supply, though provided for, is seldom required.

Trials carried out with this boiler installation have shown efficiencies of between 67 and 69.7 per cent. when using a fuel having the low heating value of 2721 kg.cal. (equal to 4897 B.t.u.). From 2.66 to 3.01 lb. of water were evaporated per pound of fuel; the rate of evaporation varied from 2.1 to 4.1 lb. per sq.ft. of heating surface. The waste gases contained from 16.1 to 17.2 per cent. CO_2, corresponding to an excess of air of only 1.08 per cent. above that theoretically required. The successful exploitation of the lignite deposits at Bitterfeld has caused this previously unknown and unimportant place to become a flourishing center of German electro-chemical and electro-metallurgical industries; the rapid developments here prove that electricity, generated by power from burning lignite under steam boilers, is quite capable of competing with electricity produced from the power obtained in the more customary manner. Passing on to consider American practice and experience, Bulletin 89 of the U. S. Bureau of Mines, upon "Economic Methods of Utilizing Western Lignites," by E. J. Babcock, contains some useful information upon the correct methods of burning lignite for power generation. The author of this bulletin states:

The proper combustion of lignite depends largely upon using a size of coal that will give an abundant air surface, but in addition a good draft should be so arranged that the air can be directed through the burning coal to the best advantage, and can also be controlled and closely shut down when it is desired to hold the coal at a relatively low heat. The firebox should be kept reasonably well filled, but the firing should be carried out frequently by the application of thin layers of fuel to the surface of the bed of hot lignite. The ash and clinker should be removed carefully and at a sufficient rate to prevent the accumulation of clinkers.

Many firemen fail to get good results in the use of lignite because of uneven firing. The fire is allowed to run low and then a large quantity of the lignite, much of it in large lumps and carrying a high percentage of moisture, is introduced. The large addition immediately slackens the fire and materially reduces the temperature in the firebox, and by the formation of considerable vapor, reduces still further the temperature of the gases, the heat from which should be left for boiler absorption. By such firing it is impossible to keep a uniform load with a high boiler efficiency, and much loss of fuel is experienced. By using coal of reasonably small size and firing in thin layers frequently, this difficulty is reduced to a minimum.

This view of the conditions required for the proper combustion of lignite is supported by the experience of the Hughes Electric Co., of Bismarck, N. D., which has been using the deposits of this fuel in Dakota for some years as a boiler fuel. According to C. L. Larsen, the chief engineer of this company, in order to obtain a high efficiency with lignite, it is necessary to maintain a high temperature in the boiler furnace, and the proportion of excess air must therefore be cut down to the lowest possible point. Larsen recommends for burning lignite "a flat sawdust grate with ½-in. round holes.

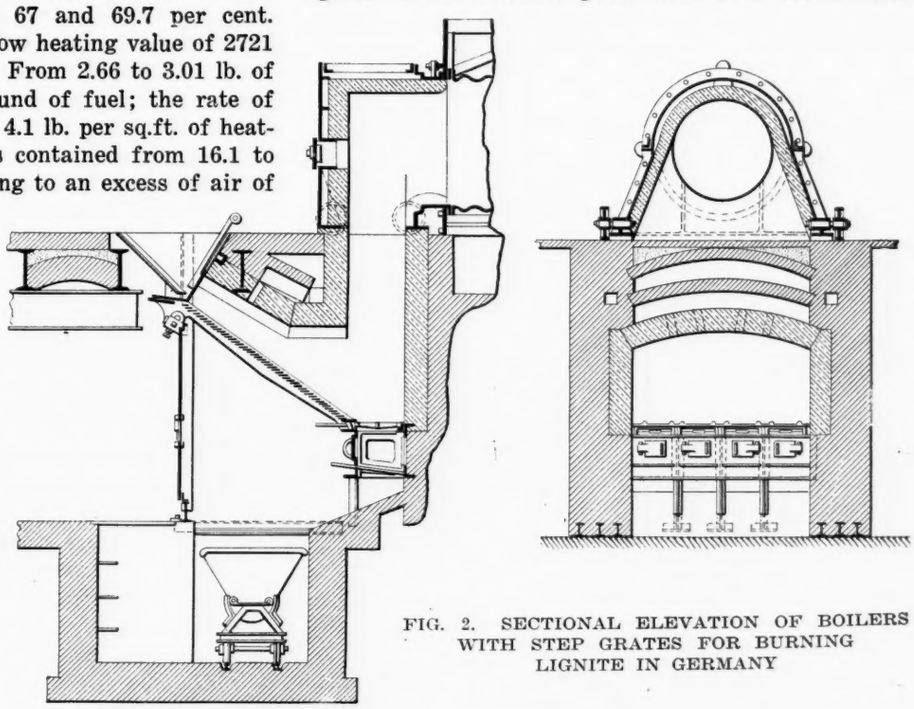


FIG. 2. SECTIONAL ELEVATION OF BOILERS WITH STEP GRATES FOR BURNING LIGNITE IN GERMANY

Such grates contain only 15 per cent. air space, but by having small openings a higher air pressure in the ash pit can be maintained, and the air passes through the small holes and through the bed of fuel at a greater velocity. This produces a high temperature in the furnace, and as the volume is small, the heat is not rushed through the boiler and up the smokestack, but is absorbed by the water in the boiler, and a low temperature in the smokestack is obtained."

Working under these conditions, Larsen asserts that an evaporation of nearly 5 lb. of water per pound of fuel can be obtained from a lignite testing 35 per cent. moisture and 6 per cent. ash, and showing only 7000 B.t.u. in the calorimeter. To obtain such an evaporation result, however, the boiler must not be pushed at all above its rated capacity, and only 3 lb. of water can be evaporated per square foot of surface per hour.

Another American contribution to the subject of lignite is that of Randall and Kreisinger (Bulletin 2 of the Bureau of Mines) upon "The Use of North Dakota Lignites for Power-Plant Boilers." The conclusions arrived at by these two investigators were (1) that a

large combustion chamber was necessary in order to obtain the best results and (2) that the gases yielded by the lignites must be completely burned in this chamber and raised to the highest possible temperature, before being allowed to come into contact with any of the water-cooled surfaces of the boiler. A Dutch-oven type of furnace was employed in this investigation, and the following is their description of the furnace and its method of operation:

> The most striking features in the construction of the furnace are the deep-set grate and the contraction of the space between the bridge wall and the end of the prolonged firebrick arch. The furnace is designed to work on the gas-producer principle. The solid fuel is gasified on the grate, and the gas passes through the space under the arch into the combustion chamber, where most of the gaseous combustible burns. The necessary air for combustion is added through the openings in the bridge wall. This air is preheated from 200 to 300 deg. F. in coils, and forced into the furnace under a pressure of from half an inch to an inch of water. The grate is 21 in. below the lower edge of the firing door. The object of this construction is to enable the fireman to carry a thick fuel bed and still see its condition at the top; the side furnace door used in removing clinkers is only seven inches above the grate.

The grate was equipped with rocking bars to facilitate the removal of ash, and each grate bar was supported by a 2-in. pipe through which cold air was circulated. The thermal efficiency of this type of furnace, when used for steam raising with lignite, was from 55 to 58 per cent., and the two investigators state that no difficulty was experienced in working up to the full capacity of the boilers. North Dakota lignite has in fact been employed with this type of furnace at the pumping plant of the U. S. Reclamation Service at Willaston, N. D., with good results. Figs. 3 and 4 show sectional elevations of the boiler and furnace.

Lignite Converted Into Briquets

Briquetting—The chief center of the manufacture of lignite briquets in Germany is at Horren, a small town lying west of Cologne, the industry at this place having been developed within the last 25 years. According to C. A. Davis, who prepared a report upon the subject in 1913 for the U. S. Bureau of Mines, there are 26 factories producing lignite briquets in this neighborhood; about 20,000 metric tons were being manufactured daily during the season of active production, at that time. The mines are on the high terraces of a broad shallow valley, the strata of coal are from 230 to 400 ft. in thickness, and the lignite is brought to the various works by an overhead transportation system.

This one district, in 1911, produced rather more than one-fourth of the total German output of lignite briquets, the largest works having 28 presses and turning out about 1600 metric tons of briquets per day of 24 hours. The following description of the method of manufacture and of the plant at the most recently erected works is taken from the report referred to above. The brown coal as mined contains 60 per cent. moisture, and when dried is dark brown in color and easily powdered. The coal on delivery at the briquet factory of the "Gewerkschaft Kohlenquelle" is first crushed and screened, and is then dried in four Schultz driers, each with a capacity of 70 metric tons per 24 hours. Each drier consists of a large cylinder of boiler iron 23 ft. in length and 10 ft. in diameter, mounted on trunnions, with the main axis inclined about seven degrees from the horizontal. Inside of the outer drum or shell of the drier is a second drum fitted with 366 tubes, each about four inches in diameter; the drier thus resembling a modern water-tube boiler. The exhaust steam from the engines is admitted to the space around the tubes, under a pressure of three atmospheres, through valves in the trunnions that support the drier. The moist powdered material is fed constantly from the storage pockets into the tubes by means of spiral conveyors, and the rate at which it passes through the drier is regulated according to its moisture content.

Technique of the Briquet Industry

To reduce 60 per cent. moisture down to 15 per cent. requires the fuel to be three-quarters of an hour in passing through the dryer. The steam from the drier is forced through a cyclone chamber by means of fans, before being turned into the atmosphere through the escape flues. By this plan the dust, amounting to 3 per cent. of the total material dried, is collected from the escaping steam and is added to the material to be briquetted. The air in all parts of the factory building is practically free from floating dust, because the dried brown coal is handled in closed conveyors and dust is not at any point permitted to escape into the factory. In this way all danger of dust explosions, which in early types of such plants were not infrequent, has been eliminated. The cost of the whole process of drying is about 70 pfennigs (or 17c.) per ton of product.

The briquetting portion of the plant consists of five compound three-cylinder horizontal engines, directly connected with open-mold plunger presses. The cross-section of the plunger and mold of this type of press is lozenge-shaped, and in the single presses is about 7 in. long by 2¼ in. wide. In this press the long axis of the mold is horizontal. In the double presses the molds are placed side by side, so that the two briquets formed at each stroke of the plungers issue from the press end to end. The powdered brown coal, containing about 15 per cent. moisture, is fed into the mold from hoppers and is subjected to a pressure of from 18,000 to 22,500 lb. per sq.in. A pressure equivalent to 300,000 to 400,000 lb. is exerted therefore on each briquet. The press forms, or plates that form the molds of the briquet presses, are made of hardened steel and are changed when they become so worn that the plunger no longer fits the mold well enough to make good briquets. The chief cause of the wear is the sand or other mineral matter contained in the powdered raw material. The time that these plates last varies from three days to about four weeks, according to the amount of mineral matter present. The briquets weigh about 7 lb. each. No pitch or binding material of any sort is used in manufacturing them; the tarry matter liberated from the brown coal by the heat developed in compressing the material serves this purpose. The briquet presses are jacketed and water-cooled. Each single press has a capacity of about 70 metric tons of briquets per 24 hours and requires 120 hp.; a double press requires 200 hp.

The power for driving the plant is obtained from a battery of eight boilers, fired entirely by brown coal as

mined, and containing 60 per cent. moisture. The boilers together furnish 750 hp. and supply steam to the engines at a pressure of 180 lb. In addition to the boilers there is a superheater in which the steam for the driers is superheated to 300 deg. C. One carload out of three of the brown coal brought to the plant from the mine is sent directly to the feed hoppers of the boilers. From these hoppers the material is fed by mechanical stokers to the fires, and is burned on step grates. Each boiler has about 1300 sq.ft. of heating surface; 270 sq.ft. of superheater area and 65 sq.ft. of grate area. Only three men are required to attend to the entire battery of eight boilers—one keeps the feed hoppers filled, shifts and empties cars, etc.; the others attend to the stokers and grates. The briquets sell for $1.90 per ton at the factory; the retail selling price at Cologne in 1913 was $2.75 per metric ton.

As regards American experience, the U. S. Bureau of Mines in 1908 to 1910 carried out some valuable experimental work with the lignite found in North Dakota, Texas and California, in order to ascertain whether the methods and form of briquetting press used in Germany (and described above) could be applied with success to these American lignites.

[2] "Briquetting Tests of Lignite at Pittsburgh, Penn.," by C. L. Wright.

The results of this inquiry are recorded in Bulletin 14 of the Bureau of Mines[2], and although the investigation was not completed, sufficient testing has been carried out to prove that many of the American lignites are quite as good as the German ones in thermal value, and that they can be briquetted upon a commercial scale without the use of any binding material. It has also been proved that contrary to the generally held opinion, lignites that had been slacked by exposure to atmospheric influences could still be briquetted without a binder. Cohesion and weather tests which were made with raw lignite, and with the finished briquets, showed that the latter were the superior in resistance to handling, and also to weather influences.

With regard to practical developments, a description of a plant at Denver, Colo., designed for the commercial production of briquets and valuable byproducts from lignite, was published in *Coal Age*, Apr. 15, 1916. The fuel at this plant is subjected first to dry distillation in order to obtain gaseous fuel, light oils, ammonium sulphate and creosote and pitch; the residue of coke left in the retorts is finally briquetted with the aid of binding materials. The ovens or retorts are designed to take ten-ton charges, and the heating period lasts two hours at a temperature of 500 deg. C. The yield of byproducts at this temperature, per ton of raw lignite, is stated to be as follows: Gas, 10,000 cu.ft., tar-oil, 13 gal., ammonium sulphate, 2.5 lb. The pitch and some other binding material are employed for briquetting the residue of coke left in the retorts, after the distillation is completed. The briquets, or "carbonets," as they are called locally, have the following composition: Moisture, 1.34 per cent.; volatile matter, 7.60 per cent.; ash, 7.02 per cent.; fixed carbon, 84.04 per cent.; calorific value, 14.061 B.t.u. They withstand unfavorable weather conditions and rough handling quite

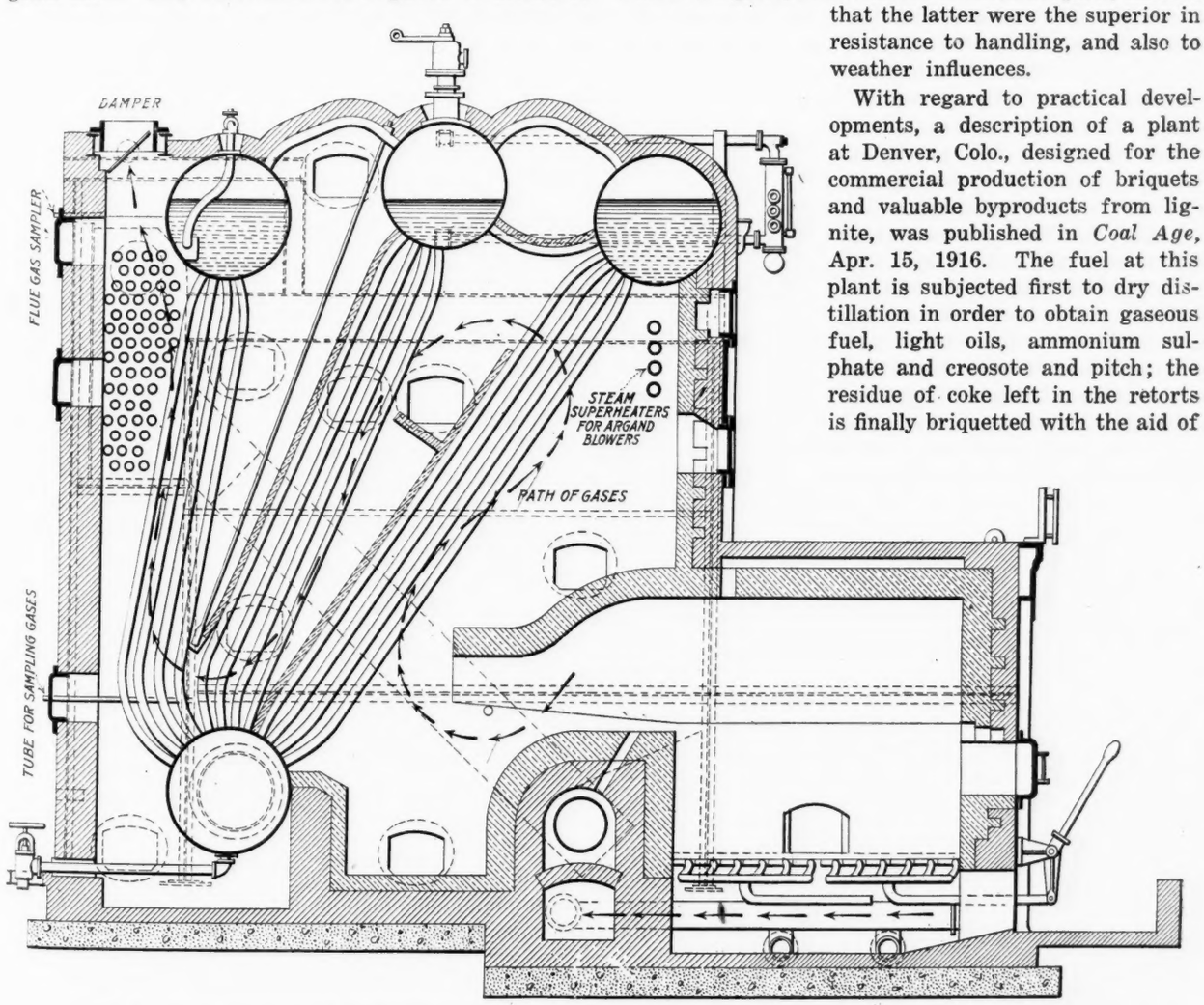


FIG. 3. SIDE SECTIONAL ELEVATION OF BOILERS FOR BURNING LIGNITE AT WILLASTON, N. D.

satisfactorily, and also retain their form when burned until they are practically all consumed. The Denver works as originally planned were designed for the treatment of 500 tons of raw lignite per day, and the briquetting plant for an output of 25 tons per hour.

The details of this method of treating the Colorado lignites were worked out in the laboratory before the works were designed or erected, and it is hoped that this careful preliminary study of all the scientific data will lead to the foundation of a new and flourishing local industry.

Valuable Byproducts Derived from Lignite

Distillation and Recovery of Byproducts—A lignite suitable for low temperature distillation is characterized by a high content of bituminous matter. In the absence of this bitumen the fuel is not adapted for the retort process and is only suitable for direct burning by either of the two methods previously described in this article. One can distinguish roughly between the two classes of lignite by observing closely the changes that occur on heating, and by comparing the specific gravities of the samples. Lignites suitable for subjection to the distillation or retort process melt or soften before ignition and burn with a smoky flame; they also possess a specific gravity between 0.90 and 1.10, whereas the lignites suitable for direct burning do not soften or melt on heating, and have a specific gravity of 1.2 to 1.4.

The distillation of lignite is carried on in Germany at two centers—at Halle in Saxony and at Messel near Darmstadt. Stewart, in a paper read before the Edinburgh section of the Society of Chemical Industry in January, 1917[3], has given a full account of the process as carried out at these two centers, and has described the method and apparatus used for the recovery of the byproducts. The latter consist of crude oil, containing various hydrocarbons of the paraffin and aromatic series, paraffin wax, and a coke testing about 12,600 B.t.u. The yield of crude oil at Halle is about 18 gal. per ton of lignite; in this district there are twelve works which distill one million tons of brown coal per annum and produce 60,000 tons of crude oil and 7000 tons of paraffin wax. At Messel the crude oil is distilled from the lignite in the presence of steam, and the coke that remains in the retorts is dropped directly into gas producers below. Vertical retorts (covered by German patent 200,602 of May, 1906) are employed—the working of these being continuous—and the brown coal is fed into the retort from a hopper closed by a valve. In the upper part of the retort the lignite is dried, and the steam produced here is drawn off by an electrically driven fan. Part of this steam is reintroduced into the retort lower down, in order to keep the temperature at the required low limit; the remainder is used for the gas producer, which is worked with the coke residue from the retort process. The laboratory distillation of the lignite used at Messel yields 44 per cent. moisture; 7.8 per cent. crude oil; 6.2 per cent. gas; and 36 per cent. of coke; the latter, as already explained, is used for gas production and no marketable coke is produced. The actual yield of crude oil is about 19 gal. per ton of lignite; the final products obtained by distillation of the crude oils are benzine, solar oil, pale vaseline oil, fat oil, solar scale, red oil, heavy vaseline oil and paraffin wax.

In America the only distillation works of which full details have been published are those referred to in this article as established at Denver, Colo., in 1915, for the production of briquets and byproducts from the Colorado lignites. The ovens or retorts here are 36 ft. long by 9 ft. high by 18 in. wide; the charging period is 2½ hours, and the temperature limit is 500 deg. C. The average yield is 10,000 cu.ft. of gas, 13 gal. of tar oils and 2½ lb. of ammonium sulphate. The gas is used for heating the ovens and also for steam generation, in order to supply the plant with the necessary electric power; the crude oil is distilled and is separated into light oils, heavy oils and pitch. At temperatures up to 150 deg. C., 10 to 14 per cent. of the crude oil passes over to the light oils storage tank, and between 150 and 325 deg. C. the heavy creosote oils, which form about 68 per cent. of the total oil, are distilled. The manufacture of briquets from the lignite coke has already been referred to under "Briquetting," and it is only necessary to add that the works was planned by C. O. Hoover, of Denver, and that it is owned by the American Coal Refining Company.

A large amount of experimental work upon the distillation of North Dakota lignites has been carried out at Grand Forks by the College of Mining and Engineering of North Dakota, where a specially designed briquetting and gas-making plant has been erected for the purpose of studying the utilization of lignites. The details and results of the investigation are given in Bulletin 89 of the U. S. Bureau of Mines[4].

This bulletin contains a full account of all the experimental work carried out, in order to determine the best conditions for the gasification of lignite. The relation between the moisture content of the raw lignite and the yield and thermal value of the evolved gas was closely studied, and the effects of temperature variations were also examined and tabulated. The statement in Table I, prepared from the figures presented in the bulletin, shows the average results of the gasification tests made in this experimental plant with 25 representative samples of United States lignites.

Certain Lignites Converted Into Gas

Gasification Without Recovery of Byproducts—The fact that many lignites are too poor in their content of bituminous matter to render distillation profitable accounts for some of the past failures that have occurred with plants erected for this purpose. Lignites of this type, however, are quite suitable for gasification without attempting the recovery of the tar or ammonia: there are many places where gas producers, of the type designed for use with bituminous fuel, would prove of great value in connection with the utilization of lignite deposits. Small plants of this kind are quite as efficient as large ones, for there is no necessity to design the plant on the large scale that is required for successful byproduct recovery. Whether the gas obtained from these lignite gasification plants would be best used to raise steam or for direct power production in gas engines would depend upon local conditions and require-

[3]Journal Society Chemical Industry, Feb. 28, 1917.

[4]Economic Methods of Utilizing Western Lignites, by E. J. Babcock.

ments. In New Zealand the use of lignite producer gas for power production is quite common in the electric power stations, and the natural moisture content of the raw lignite renders it possible to work the producers without steam. Producers of this type, in which the upper part is used as a gas retort and the lower part as an ordinary producer, have been designed by Ziegler, Zwingenberger and others and have been successfully employed for peat and lignite gasification in Germany and Austria.

"Bagasse" is the technical name for the tough fiber that is left after milling sugar cane, for extraction of the sugar. The proportion of combustible matter in this residue varies considerably in different districts, ranging from 35 to 60 per cent., while the water content and ash make up the balance of 40 to 65 per cent. In Louisiana the average composition is fiber, 40 per cent., sucrose and other sugars, 7 per cent., and moisture, 53 per cent. The heat value of dry bagasse is found by experiment to be 8300 B.t.u. The proportion of the total heat which can be rendered available in practice, for power generation, depends upon the percentage of water which remains in the bagasse when burned.

Heating Value of Bagasse

According to Freeland,[5] the average Louisiana product has a calorific value of about 8300 B.t.u. per lb. of dry bagasse, and from 3620 gross (56.7 per cent. moisture) to 4800 B.t.u. (42.8 per cent. moisture). The net heating values are respectively 2200 and 3350 B.t.u., and 1 lb. of this wet bagasse will evaporate from 2 to 3½ lb. of water, from and at 212 deg. F. Professor Kerr found that at a Louisiana sugar house the bagasse from one ton of cane generated from 1.16 to 1.44 b.-hp. The bagasse from a 1000-ton house will generate therefore a total of 1160 to 1440 b.-hp.-hr. per 24 hours, and it would require about 60 tons of coal per day to do the same work. Professor Kerr has also stated that in Louisiana 16 per cent. of the total heat generated by the combustion of 1 lb. of bagasse was required to evaporate the moisture present in the raw material. As about 14½ per cent. of the moisture in bagasse could be removed by drying, the dry bagasse had a heating value 55 per cent. greater than the wet bagasse. For this reason the methods of burning bagasse are now being improved, and in the larger sugar-cane factories of Cuba and Hawaii the bagasse is subjected to a preliminary drying before entering the combustion area of the grate.

TABLE I. AVERAGE RESULTS OF GASIFICATION TESTS

	Yield per Ton	Calorific Value per Cu.Ft. B.t.u.	Composition—Per Cent. H	CO	CH_4	CO_2	N
Gas	11,038 Cu.Ft.	396	40.1	20.09	15.31	10.48	9.98

	Yield per Ton, Lb.	Calorific Value B.t.u.	Composition—Per Cent. C	Vol. Matter	Ash	S	H_2O
Coke	1,092	11,838	75.52	7.57	15.91	1.98	1.00

Methods of Burning Bagasse—The grate surface must be small in furnaces intended for burning the waste sugar cane, since the rate of combustion is high, rising at times to 300 lb. per square foot of grate surface per hour. In some of the recently installed 500-hp. boilers the grate area is only 25 sq.ft., whereas a coal-fired boiler would require quite three times this area for the satisfactory combustion of the same equivalent weight of fuel.

In many other respects, the grates and methods used for burning bagasse resemble those employed for coal, with high volatile matter content. Mechanical stokers are also now being tried since, with stokers of the coking type, the bagasse can be subjected to a preliminary drying and its heat value improved before actual combustion occurs. When used with these stokers the bagasse is spread out upon the front portion of the stoker and the rate of feed is regulated so as to obtain the maximum heating effect. Furnaces of the step-grate type are also being used in some of the more up-to-date sugar mills, for the air supply is more easily controlled with this type of grate.

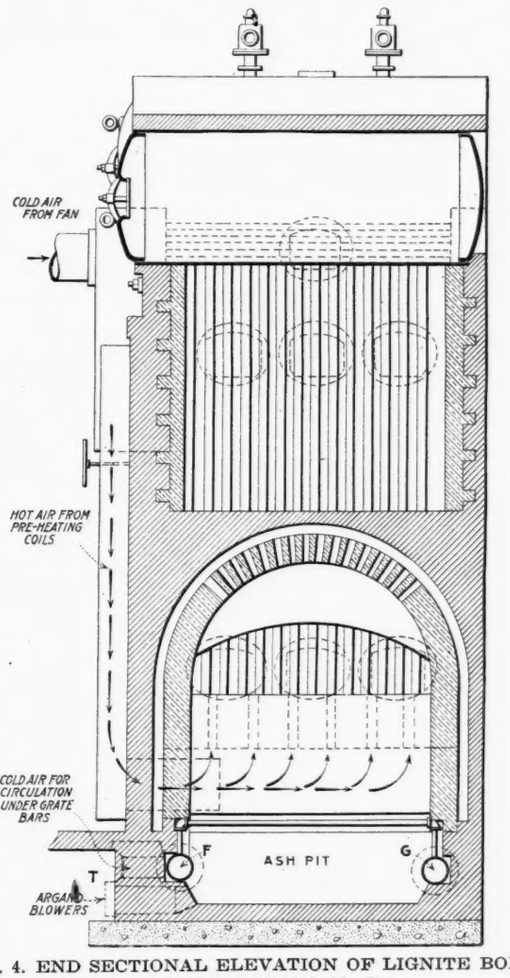


FIG. 4. END SECTIONAL ELEVATION OF LIGNITE BOILERS AT WILLASTON, N. D.

Sawmill refuse is one of the staple fuels for steam-power plants in certain of the timber-felling districts of the United States, Canada and Australia, and a considerable amount of power is also developed from the wood shavings and refuse produced by the woodworking factories in cities where boxes and packing cases are made by machinery on a large scale. The waste material produced in these mills and factories may be burned either directly under steam boilers, or it may

[5] Journal American Society Mechanical Engineers, November, 1917.

be gasified[8] in producers and the gas employed in gas engines.

According to Fernald, manufacturers of gas producers are now designing producers specially for gasifying the waste fuels of this type; with reasonably dry raw material for feeding the producers, the consumption of wood has been reduced to 2 lb. per b.-hp.-hr. as generated by the gas engine. The figures for the best results yet attained with these various kinds of wood waste, when gasified in producers and the gas used in gas engines, running at full load, are as follows:

	Lb. per Hp.-Hr.
Box blocks	2.15
Mulga scrub	2.30
Pine shavings and blocks	2.31
Jarrah-wood sawdust and shavings	2.40
Spent tanbark (dry)	3.13
Spent tanbark (wet)	4.50
Sawdust	3.50

As examples of the type of furnace used in the United States and Canada for burning sawmill refuse under steam boilers, the equipment at the plant of the Portland (Oregon) General Electric Co., and at the Rockwell Manufacturing Co., New York, may be cited. The boilers at the former plant are provided with external furnaces of the Dutch-oven type. These furnaces are provided with charging holes, into which the sawdust and wood waste are tipped from the conveyors which transport it from the timber yards of the locality, and the Dutch-ovens are kept completely filled in order to prevent air leakage. The two generating stations of the company in Portland, equipped with this style of wood-burning plant, consume 100 to 150 box loads of refuse (equivalent to 20,625 cu.ft.) per day of 24 hours, and the average evaporation attained is 10,500 lb. water, per 200 cu.ft. of cut fuel. Assume that 1 cu.ft. of the refuse weighs 15 lb.; this equals an evaporation of 3.5 lb. of water per pound of wood, which is quite a good result under the circumstances. The calorific value of wood varies from 8300 to 9000 B.t.u., and its maximum evaporation value in practice is 5 lb. of water per pound of fuel.

At the Rockwell Manufacturing Co.'s plant there are two 125-hp. horizontal tubular boilers installed, each 66 in. by 18 ft., with 1250 sq.ft. of heating surface and working at 150 lb. steam pressure. A blower fan system of collection for the woodworking waste is used, in order to collect and transport it to the boiler room. From the storage place on the boiler-room roof the waste fuel falls by gravity into the chutes that carry it to the furnaces.

Six Out of Ten Miners Foreign-Born

In the bituminous-coal industry 62 per cent. of the workers are of foreign birth. The percentages in various other industries range from 85 per cent. in sugar refining down to 13 per cent. in collar, cuff and shirt manufacturing. Three out of four of the foreign-born workers are able to read or write their own language. A little over one-half of the foreign-born workers from non-English-speaking countries are more or less able to use the English language.

[8]U. S. Bureau of Mines, Technical Paper No. 123, "Notes on the Use of Low-Grade Fuel in Europe."

Discrimination in Favor of Shipper Need Not Affect Rates

That there may be a discrimination or concession in favor of a shipper in violation of the Elkins Act as amended by the Hepburn Act, although there is no discrimination affecting transportation charges or rates, is the principal holding in the case of United States vs. Metropolitan Lumber Co., recently decided by the United States District Court for the District of New Jersey.

The indictment charged that the defendants, notwithstanding a governmental embargo on the shipment of lumber, caused lumber to be consigned to the defendants in such a manner that the Pennsylvania R.R. was led to believe that the shipment constituted a consignment of war supplies when in fact it did not, and that thereby a discrimination was practiced. On demurrer to the indictment it was contended that the facts alleged charged no offense in that there had been no discrimination as to rates. The court held this position to be untenable, and decided that a discrimination within the law was charged. The effect of this holding appears to be that any privilege or concession obtained by a shipper, not accorded to shippers in general, is within the statute.

It is also held in this case that a consignee who obtains a discrimination for his benefit is liable as a "shipper" within the law, and that an offense may be committed under the statute although there is no knowledge or connivance on the part of the carrier. The opinion, which is per Haight, J., contains a searching review of the legislation and decisions.

Output of Fuel Briquets in 1918 Greatest Yet Recorded

The production of fuel briquets in the United States in 1918 was 477,235 net tons, valued at $3,212,793, an increase, compared with 1917, of 70,379 tons, or 17 per cent., in quantity, and of $978,905, or 44 per cent., in value. The production in 1918, which represented the results of the third successive year of material progress in the industry, was the highest yet recorded. It was more than double the production in the year 1915.

The number of plants in operation in 1918 was one less than in 1917. Three of the plants that were operated in 1917 were idle in 1918—those of the Denver Coal Byproducts Co. (formerly the American Coal Reduction and Byproducts Co.), in Colorado; the Johnson Fuel Co., in North Dakota, and the American Briquet Co., in Pennsylvania. Two new companies, at Trenton, N. J., began operations in 1918, the Fuel Briquet Co. and the Trent Brick Co. The Belgian Coal Briquette Co., of New York City, and the Anthracite Briquet Co., of Sunbury, Penn., expect to begin operations during 1919.

Of the 12 plants in operation in 1918 six used anthracite as a raw material, one Arkansas semi-anthracite, one semi-bituminous slack, one anthracite culm and bituminous slack, one bituminous slack and sub-bituminous coal, and two oil-gas residue. Coal-tar pitch and asphaltic pitch were used as binders by six plants, one used sulphite pitch, two used no binder, and three used a vegetable binder or employed special processes.

Cost of Mule and Locomotive Haulage

By William L. Cross, Jr.
Scranton, Penn.

FOR some time I have been looking for a method of comparing the relative costs of mule and locomotive transportation with especial reference to gathering and short haul work where frequently it is a question as to which of several systems is the cheaper. This article deals with a method that I finally devised, one that has proved satisfactory.

By means of curves similar to those shown in Fig. 2 most of the problems commonly met with can be quickly and easily worked out on a comparative basis. Other

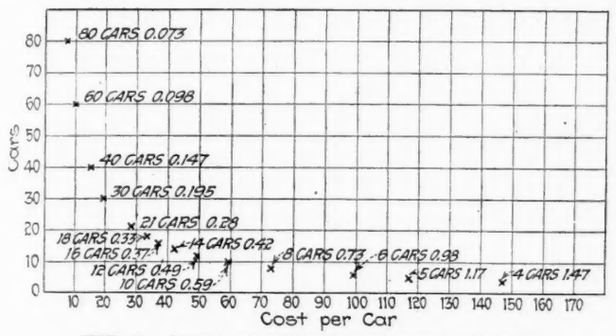


FIG. 1. DATA PLOTTED FOR COST CURVE

factors, such as availability of power and the possibility of securing locomotives and equipment, are matters for consideration after or before the relative costs of the different organizations are determined. The data from which the costs were compiled are not by any means correct for all cases, but a set of curves can easily and quickly be made up for each colliery or group of mines which will be approximately correct in all cases.

The curves are made up as shown in Fig. 1, and from figures similar to those appearing in Table I, worked out in this case for one driver and one mule, as follows:

TABLE I. COST PER CAR FOR ONE DRIVER AND ONE MULE

Cars	Cost per Car	Cars	Cost per Car
4	$1.47	18	$0.33
5	1.17	21	.28
6	.98	30	.195
8	.73	40	.147
12	.49	60	.098
14	.42	80	.073
16	.37		

The figures in Table I, when plotted as shown in Fig. 1, give the basis for the regular curve for an organization or transportation unit of one driver and one mule, The other curves shown in Fig. 2 are plotted in a like manner. In the case of locomotive haulage, the power, installation and repair costs given or estimated for any single locality will not be correct for every installation. This is one weak point in the tabulation. However, because unforeseen conditions usually develop in mine electric installations, and at the present time repairs and repair parts are costly, it is best to be on the safe side and figure locomotive maintenance high.

A close inspection of these curves will also show that the handling of four or five more cars makes much more difference in the cost per car than does a few cents in the figures representing power, repairs, etc. For instance, in the case of a crab locomotive with one engineer and two brakemen working in pitching rooms, let us estimate that this machine will handle 40 cars per day. This, from Fig. 2, would cost 60c. per car. If another place can be added so that the machine will handle 44 cars, it will do so at a cost of 56c. per car—a saving of four cents per car, or $1.76 per day. We cannot always estimate mine haulage possibilities closer than four cars, but our cost figures certainly will not be in error to the amount of $1.76.

Two representative problems are given below to ilustrate the use of the curves:

Problem 1—Assumption by colliery superintendent that his transportation gathering cost shall not be over 60c. per car. How many cars must each unit handle in order to give him this cost?

Follow the dash line on Fig. 2: It crosses one driver and one mule at 10 cars; one driver and two mules at 12 cars; one driver, one runner and two mules at 19 cars; one driver, one runner and three mules at 22 cars; one driver, two runners and three mules at 29 cars; one locomotive, one engineer and one brakeman at 34 cars; one locomotive, one engineer and two brakemen at 40 cars.

Problem 2—It is known that one driver, two runners and three mules in a certain section where there are

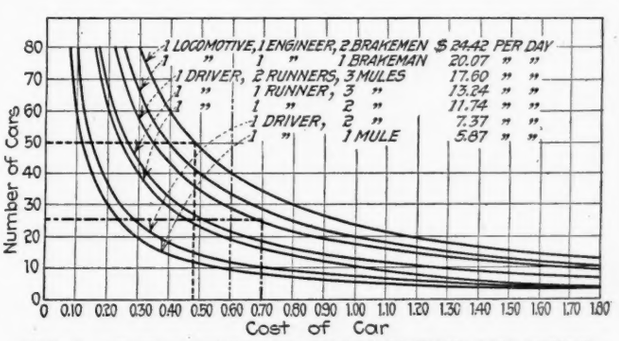

1 LOCOMOTIVE, 1 ENGINEER, 2 BRAKEMEN $ 24.42 PER DAY
1 " 1 " 1 BRAKEMAN 20.07 " "
1 DRIVER, 2 RUNNERS, 3 MULES 17.60 " "
1 " 1 RUNNER, 3 " 13.24 " "
1 " 1 " 2 " 11.74 " "
1 DRIVER, 2 " 7.37 " "
1 " 1 MULE 5.87 " "
Number of Cars
Cost of Car

FIG. 2. COST CURVES FOR VARIOUS HAULAGE UNITS

	Per Day
Locomotive Data:	
Power, $90 per month	$3.60
Installation, $2000, 5 per cent of $2000 Depreciation—Locomotive, 15 per cent of $8000 Repairs—Locomotive lines, etc., $900 per year	$2200 pr. yr. 7.33
Labor—Engineer at $0.28, plus $0.25 allowance for 9 hours.	4.77
Brakeman at $0.2351, plus $0.25 allowance for 9 hours	4.36
Mule Data:	
Mule value, $250; 20 per cent. depreciation; 5 per cent. interest	0.23
Feed and care	1.25
Labor—Driver at $0.2351, plus $0.25 allowance.	
Runner at $0.2351, plus $0.25 allowance.	

pitching rooms will handle 25 cars per day. This section due to its development can produce 50 cars per day with two-mule organizations. Which relatively is the cheaper plan, to use two-mule organizations or one crab locomotive to handle 50 cars?

By following the two dotted lines in Fig. 2 it will be seen that one driver, two runners and three mules will handle 25 cars at a cost of 70c. per car; one locomotive, one engineer and two brakemen will handle 50 cars at a cost of 48c. per car. This shows in this case, of course, that the locomotive is the better installation.

This presupposes that power lines are fairly near the

section and that one will not have to wait a year or a year and a half to get a locomotive.

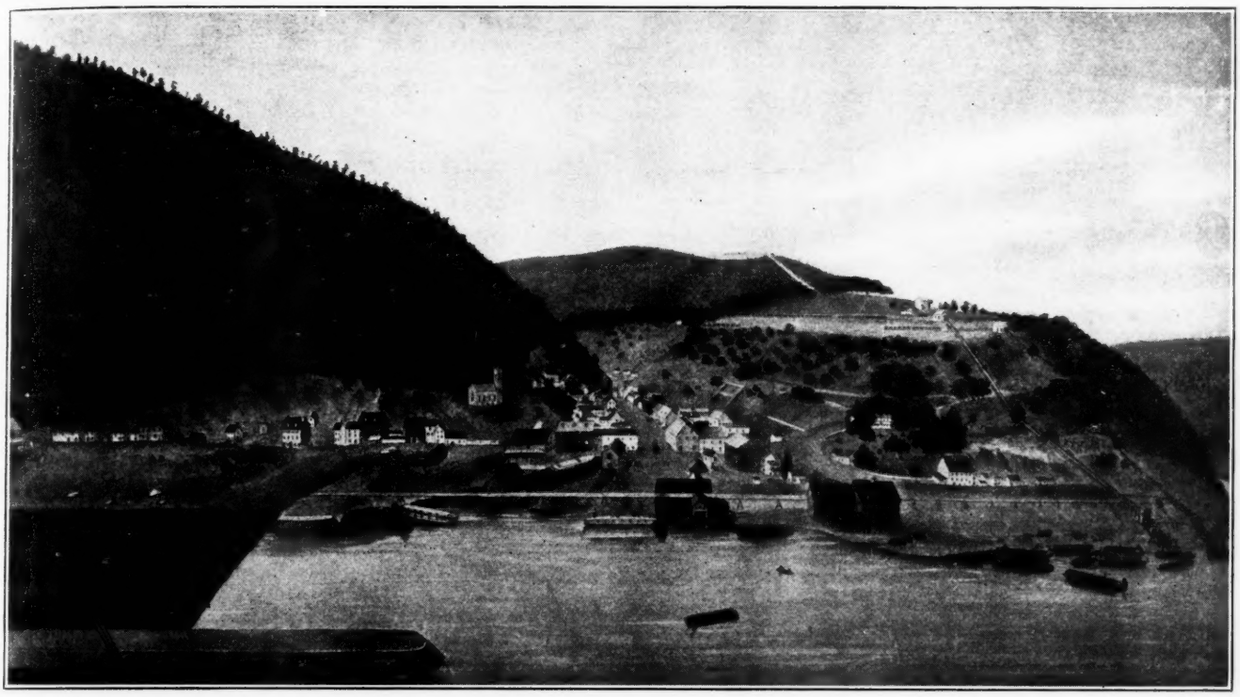
Close inspection of the curves in Fig. 2 will also show that there is a certain fairly definite limit to the number of cars handled, below which the cost per car increases rapidly. This limit can be taken from the curves by noting the point at which the curve from right to left deviates from practically a straight line. Thus, for instance, in the case of the one driver and one mule curve, the line is practically straight from the right-hand side of the figure to the 10 or 12 car point, and from here turns rapidly into a curve. This possibly is better illustrated by Table II. These figures give the costs per car for the various organizations or units.

Taking the limit for the differences or decrease in cost per car at 4c., we see that 12 cars must be handled by one driver and one mule, 18 cars by one driver, one runner and three mules, etc., before this limit is reached. Taking 2c. as the limit, 16 cars must be handled by one driver and one mule, and a corresponding number by other units before reaching this limiting figure.

A further study of these curves will bring out other applications, but great care must be taken in their practical use as, unless the actual mining conditions are clearly understood and the practical working limits of the various organizations carefully taken into consideration, the curves may show a low cost for an impractical organization, or transportation unit.

TABLE II. COST PER CAR FOR DIFFERENT UNITS FOR INCREASING NUMBER OF CARS

Cars	One Driver, One Mule, Cost per Car	Decrease in Cost per Car	One Driver, Two Mules, Cost per Car	Decrease in Cost per Car	One Driver, One Runner, Two Mules, Cost per Car	Decrease in Cost per Car	One Driver, One Runner, Three Mules, Cost per Car	Decrease in Cost per Car	One Driver, Two Runners, Three Mules, Cost per Car	Decrease in Cost per Car	One Engineer, One Brakeman, One Locomotive, Cost per Car	Decrease in Cost per Car	One Engineer, Two Brakemen, One Locomotive, Cost per Car	Decrease in Cost per Car
1	$5.87		$7.37		$11.74		$13.24		$17.60		$20.07		$24.42	
		2.94		$3.69		$5.87		$6.62		$8.80		$10.04		$12.21
2	2.93		3.68		5.87		6.62		8.80		10.03		12.21	
		.97		1.22		1.96		2.21		2.93		4.34		4.07
3	1.96		2.46		3.91		4.41		5.87		6.69		8.14	
		.49		.62		.97		1.09		1.47		1.67		2.03
4	1.47		1.84		2.94		3.32		4.40		5.02		6.11	
		.30		.37		.59		.67		.88		1.01		1.22
5	1.17		1.47		2.35		2.65		3.52		4.01		4.89	
		.19		.25		.39		.44		.58		.66		.82
6	.98		1.22		1.96		2.21		2.94		3.35		4.07	
		.14		.17		.28		.32		.42		.48		.58
7	.84		1.05		1.68		1.89		2.52		2.87		3.49	
		.10		.13		.21		.29		.32		.36		.43
8	.74		.92		1.47		1.65		2.20		2.51		3.06	
		.09		.10		.16		.18		.24		.28		.34
9	.65		.82		1.31		1.47		1.96		2.23		2.72	
		.06		.08		.14		.15		.20		.22		.28
10	.59		.74		1.17		1.32		1.76		2.01		2.44	
		.06		.07		.10		.12		.16		.18		.22
11	.53		.67		1.07		1.20		1.60		1.83		2.22	
		.04		.06		.09		.10		.14		.16		.18
12	.49		.61		.98		1.10		1.46		1.67		2.04	
		.04		.04		.07		.08		.11		.13		.16
13	.45		.57		.91		1.02		1.35		1.54		1.88	
		.03		.04		.07		.07		.09		.10		.14
14	.42		.53		.84		.95		1.26		1.44		1.74	
		.03		.04		.06		.07		.09		.10		.11
15	.39		.49		.78		.88		1.17		1.34		1.63	
		.02		.03		.05		.05		.07		.09		.11
16	.37		.46		.73		.83		1.00		1.25		1.52	
		.02		.03		.04		.05		.07		.07		.08
17	.35		.43		.69		.78		1.03		1.18		1.44	
		.02		.02		.04		.04		.05		07		.08
18	.33		.41		.65		.74		.98		1.11		1.36	
		.02		.02		.03		.04		.05		.06		.08
19	.31		.39		.62		.70		.93		1.05		1.28	
		.02		.02		.03		.04		.05		.05		.06
20	.29		.37		.59		.66		.88		1.00		1.22	
		.01		.02		.03		.03		.04		.04		.06
21	.28		.35		.56		.63		.84		.96		1.16	
		.01		.02		.03		.03		.04		.04		.05
22	.27		.33		.53		.60		.80		.92		1.11	
		.01		.01		.02		.03		.04		.04		.05
23	.26		.32		.51		.57		.76		.88		1.06	
						.02		.02		.03		.04		.04
24					.49		.55		.73		.84		1.02	
						.02		.02		.03		.04		.04
25					.47		.53		.70		.80		.98	
						.02		.02		.03		.03		.04
26					.45		.51		.67		.77		.94	
						.02		.02		.02		.03		.04
27					.43		.49		.65		.74		.90	
						.01		.02		.02		.03		.03
28					.42		.47		.63		.72		.87	
										.02		.02		.03
29									.61		.69		.84	
										.02		.02		.03
30									.59		.67		.81	
										.02		.02		.03
31									.57		.65		.78	
										.02		.02		.02
32									.55		.63		.76	
										.02		.02		.02
33									.53		.61		.74	



Mauch Chunk, Pennsylvania, in 1845—Shipping point for the Lehigh Coal and Navigation Company —From an old print

The Story of Coal

By W. B. Richards, M.E.
Lansford, Penn.

WHAT is probably the first reference to coal as a fuel is found in the Bible (Proverbs XXVI, 21) in the words: "As coals are to burning coals and wood to fire, so is a contentious man to kindle strife." This particular sentence was written in 1016 B.C., at the time King Solomon came into power. Part of this ruler's domain consisted of Syria, and near the present City of Beruit coal mines were worked at that time. Coal is being mined there to this day.

The earliest notice we find of stone coal is in 371 B.C., at which time Theophrastus, a Greek author, mentions *Lithanthrax* as being found at Ellis and refers to its use by the smiths of that period. In England tools and cinders have been found in the excavations near the Roman Wall, indicating that the Britons were familiar with the use of coal prior to the Roman Invasion in 54 B.C.

The first actual record of a coal transaction exists in the form of a receipt for twelve cartloads of coal, which was given by the Good Abbott of Peterborough, in England, in 852. At about this time the monks of Belgium mined the "earth fuel" and used it for manufacturing purposes.

In 1239 King Henry III of England granted the privilege of digging coal to the good men of Newcastle. By a proclamation of Edward the First, and again in the reign of Queen Elizabeth, stone coal was prohibited to be used in London during the sitting of Parliament lest the health of the Knights of the Squire should suffer during their residence in the metropolis. In 1316 the Parliament petitioned King Edward II to prohibit the use of coal, and a proclamation was accordingly issued against it. Owing to the high price of wood, however, its use gradually became general in London.

Coal was used in the City of Paris in 1520. The fuel was shipped to France from the mines of Newcastle, in England. At the outset it met with little favor in Paris, as for some time was the case in London, owing to the difficulty attending its application. The coal was submitted to the Faculty of Medicine at this time, to ascertain if the new fuel would be injurious to the public health.

In America the existence of coal was proved by the French explorers at an early date. Father Louis Hennepin, Franciscan missionary, and chronicler of La Salle's expedition of 1678-1679, was the first to preach the gospel on the Niagara frontier and was the first who saw and described the Falls of Niagara. He knew of the existence of coal in 1679. On a map made by him is shown a "cole" mine above Fort Crevecour, on the Illinois River, near the present site of Ottawa. In his journal he states that in the country then occupied by the Pimitoui Indians there were mines of coal, which is the earliest record of the existence of coal in America. Father Hennepin also marks the site of a coal mine on the James River, near Richmond, Virginia.

In the Atlantic Coast Triassic coal field lies the Richmond Basin. This basin contains the oldest worked mine in America, and the first systematic coal mining in the United States was carried on within its borders. Coal was used in America as early as 1750, and in 1779 shipments were made to northern cities. The use of coal at that time was credited with lessening the febrile ailments of the inhabitants. During the War of Independence it was used at Westham, on the James

River, five miles above Richmond, for the manufacture of shot and shell. This plant was destroyed by the traitor Arnold in 1781.

At what precise period the bituminous coal of western Pennsylvania first came into use is not known. In 1684 privilege was granted by William Penn to mine coal in Pittsburgh. The earliest record of coal mining in the Pittsburgh region is that supplied by Thomas Hutchins, who visited Fort Pitt (now Pittsburgh) in 1760 and found a "cole" mine opened on the west side of the Monongahela River.

In 1775 S. Boyd took up and patented a tract of land to mine coal. In 1804 coal was shipped from mines at the headwaters of the Susquehanna River (near the present site of Clearfield) and the Indian village of Chincleclamoose down the Susquehanna River. It was sent down by Mr. Boyd and was landed at Columbus, a distance of 260 miles. It was a matter of great surprise to the inhabitants of Lancaster County to see an article with which they were wholly unacquainted brought to their door. In 1828 the first cargo of Pennsylvania bituminous coal reached Philadelphia from Karthaus, and some was forwarded to Baltimore.

Discovery of Anthracite Coal

Anthracite coal was discovered in Rhode Island in 1760. In 1762 the existence of coal in the Wyoming Valley of Pennsylvania was proved by the pioneers who had migrated from Connecticut to that region. It was found at the mouth of Mill Creek, on the Susquehanna River, near the present site of Wilkes-Barre. The Indians who inhabited eastern Pennsylvania knew of the existence of anthracite coal long before it was discovered by the white settlers, and made use of it only for pipe heads.

In 1769 Obadiah Gore, a blacksmith, was the first to use anthracite coal. He tried it in his forge and found it to give satisfaction. During 1775 mines were opened and the first shipment of hard coal was sent down the Susquehanna in boats from Wilkes-Barre to Harris Ferry, now Harrisburg; from here it was hauled in wagons to the arsenal at Carlisle, for use in the manufacture of munitions of war. These shipments were continued annually during the Revolutionary War.

Coal was discovered in the Pennsylvania Schuylkill Region in 1790, at the foot of Broad Mountain north of Pottsville, by Nick Allen, a noted hunter. He came from the New England states and was called the "black Yankee." During one of his hunting expeditions Allen had camped for the night under the shelter of some overhanging rocks and trees. He built a fire on top of fallen rocks and laid down near the fire to sleep. Some time during the night he was awakened by more heat about his legs than was comfortable, and getting up he found the stones red hot. Examining the rocks lying around, he found them black and shining, and came to the conclusion that these were stone coal, of which he had heard. He reported his discovery to the settlers in the vicinity.

Coal was discovered by Philip Ginter, a hunter, in 1791, at the present site of Summit Hill; this section is near Mauch Chunk (the Indian name meaning Bear Mountain) at the eastern extremity of the southern anthracite region. Ginter had built a rough log cabin in the forest and depended solely on the proceeds of his rifle for the support of himself and family. The game he shot included deer and bear, which he carried to the nearest store and bartered for the other necessities of life.

While returning from a hunting trip he discovered the black dirt that covered the coal bed and reported the extraordinary appearance to Jacob Weiss, an intelligent gentleman who lived at what was then known as Fort Allen (now Weisport), which was within 12 miles of the spot. An examination was immediately made and a small shaft sunk. Good coal was found at 10 feet from the surface.

Taking a keen interest in the discovery, Colonel Weiss immediately took specimens of the coal to Philadelphia and submitted them to John Nicholson, Michael Hillegas and Charles Cist, the last named a printer, of more than ordinary intelligence, who pronounced it to be the purest of anthracite coal and authorized Colonel Weiss to reward Ginter for his discovery. Ginter was accordingly given the title to a small tract of land, upon which he built a mill; however, he was shortly after deprived of this tract by the claims of a prior survey.

Hillegas, Weiss and Cist, in 1793, formed the Lehigh Coal Mining Co. They purchased for Jacob Weiss the tract of land upon which Summit Hill is now located, and afterward took up under warrant from the Commonwealth about 10,000 acres of unlocated lands, including the Mauch Chunk Mountain, embracing most of the lands now owned by the Lehigh Coal and Navigation Co. This was the beginning of the Old Company, and from that day to the present coal from these mines has been justly famed because of its purity and high calorific value.

Construct Road to Mauch Chunk

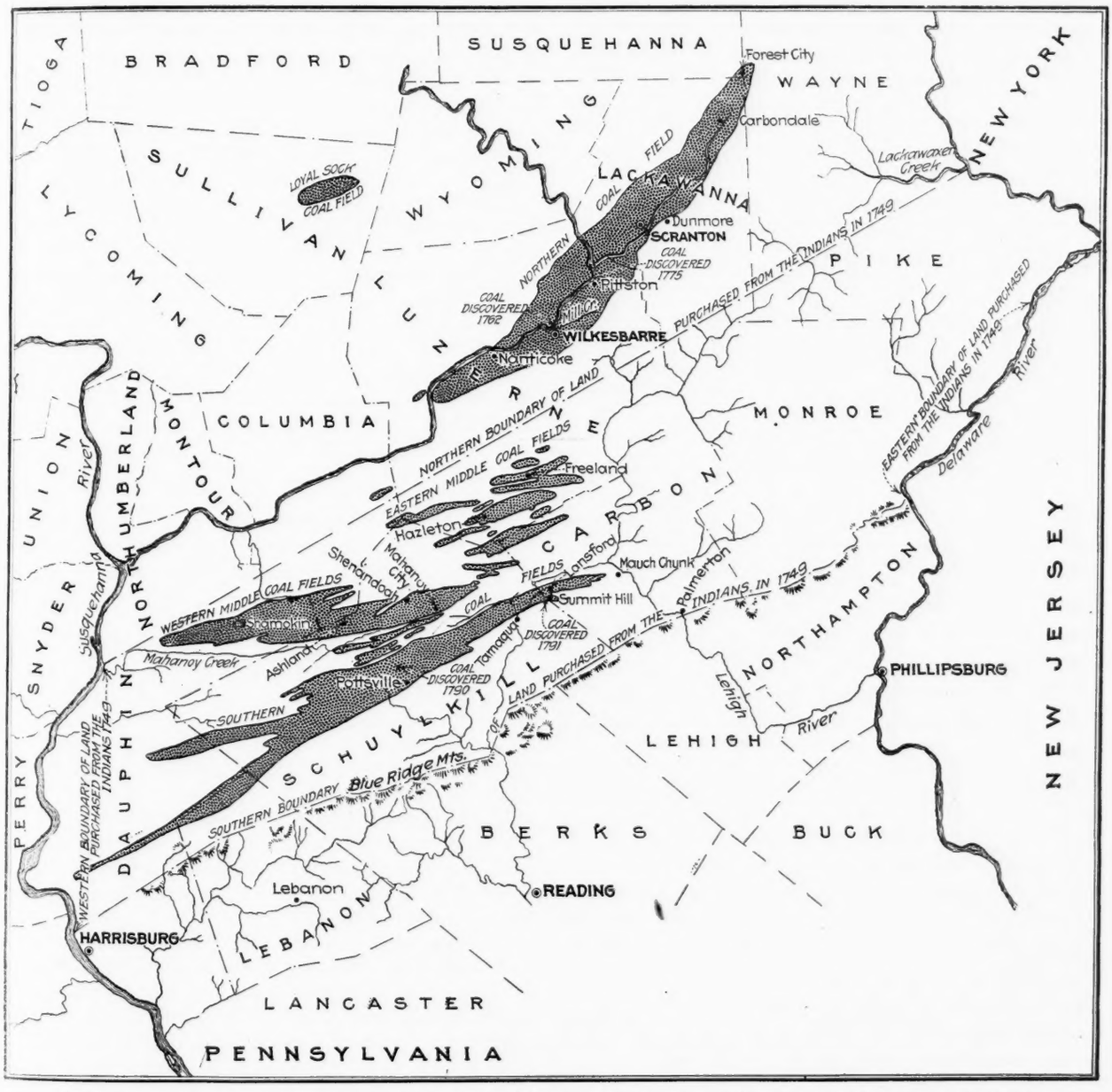
In 1793 one of the company and four miners started mining at the site of the old quarry, and an appropriation was made of £10 ($26.67) in Pennsylvania currency to construct a road nine miles long to Mauch Chunk. The coal opening was in the midst of a wild and mountainous region, surrounded by forests and only traversed by the war paths of the Indians or the trails of the hunter. The nearest market was Philadelphia, over 100 miles distant.

Many fruitless attempts were made to get coal to market over the company's road, and thence by the Lehigh River, which in seasons of low water in its unimproved state defied the floating of a canoe over its rocky bed. The difficulty of kindling the coal made its introduction anything but easy, and after calling for contributions of money from the stockholders until calling was useless, the Lehigh Coal Mining Co. became tired of the experiment and temporarily gave up in disgust.

It is an interesting matter of record that in 1788 nails were made with the aid of anthracite coal by Judge Fell of Wilkes-Barre. In 1803 the Lehigh Coal Mining Co. made another effort and sent two arkloads of coal to Philadelphia. The fuel was tried, but could not be burned, and it was rejected as worthless. The spurned material was then utilized in the making of walks, and the "black rocks" of the Lehigh Coal Mining Co came in for much suspicion and ridicule at this time.

In 1805 John and Obadiah Smith, from Derby, Conn., settled in Plymouth, Penn. They bought coal lands and immediately began shipping coal by arks to points along

the lower Susquehanna River. In 1806 William Turnbill constructed an ark (a rough timber boat) to carry about 200 tons of coal via the Lehigh River to Philadelphia. Some of this coal was sold to the manager of the Philadelphia Water Works, but because of his inexperience in handling the fuel, which seemed to extinguish the fire, it was rejected as worthless. In 1808, under the direction of Judge Fell, grates were constructed at Wilkes-Barre to burn anthracite coal for domestic purposes.



MAP OF EASTERN MIDDLE, WESTERN MIDDLE, SOUTHERN AND NORTHERN ANTHRACITE COAL BASINS

The two Middle and Southern basins were purchased from the Indians by the proprietary Government in 1749 for £500. The Northern coal basin together with the bituminous coal fields in Pennsylvania, were purchased from the Indians by the Penn family for $10,000.

In 1812 Col. George Shoemaker, of Pottsville, loaded nine wagons of coal from his mines at Centersville, about a mile from Pottsville, and proceeded to Philadelphia with them, hoping to find a market. But the opinion of the Philadelphians in regard to anthracite, or stone coal, was very unfavorable at that period—the frequent and persistent attempts to impose rocks on them for coal had aroused their indignation—and Colonel Shoemaker was denounced as a knave and a scoundrel. Colonel Shoemaker persisted, however, and disposed of two loads at the cost of transportation, one to Messrs. White and Hazard, of the Fairmount Nail and Wire Works, at the Falls of the Schuylkill, and one to the Delaware County Rolling Mill. Part of the remaining seven loads he sold for a trifle to some blacksmiths, who promised to try it; the rest he gave away.

Though Shoemaker lost money and went to considerable trouble in his attempts to introduce the fuel, the very men to whom he gave his coal obtained a writ from the authorities of the city for his arrest as an impostor and a swindler, and Colonel Shoemaker was forced to beat a hasty retreat. He only saved himself from prosecution by taking a wide circuit around the Quaker City

on his way home. Such were the trials and tribulations suffered by some of the early pioneers in the anthracite coal industry!

In the meantime Mr. White, who was anxious to succeed in burning this coal, and some of his men spent a whole morning in trying to ignite it and raise a heat in one of their furnaces. They tried every possible expedient which skill and experience in other fuels would suggest. They raked it and poked it and stirred it and blew upon the surface through open furnace doors with perseverance and persistent determination, but all to no purpose. Colonel Shoemaker's rocks would not burn, so the attempt was abandoned and the door slammed shut. Returning from dinner at the usual time, all hands were astonished at the phenomenon which they beheld on opening the doors of the furnace. A glowing mass at white heat was discovered; so hot a fire had never been seen in the furnace before. Thus the secret of proper draft was discovered, and from this time anthracite, or stone coal, found friends and advocates in Philadelphia. The motto "Let it alone" became a receipt for its use, rather than its abuse. The result of this success got into the press, and as usual soon gave it a reputation. Everybody knew stone coal was coal, now that somebody had proved it such.

Shortly before this time, when an act was about to be passed authorizing the improvement of the Schuylkill River in order to convey coal to Philadelphia, the representative of Schuylkill County in the State Senate declared that there was no coal in his district, that there was a kind of black stone called coal, but that it would not burn.

Leased Property for One Ear of Corn

In 1813 Messrs. Miner, Cist and Robinson opened mines at Room Run and Summit Hill. On Aug. 9, 1814, the first ark with 24 tons was started to Philadelphia on the Lehigh River. The coal cost $14 per ton delivered at Philadelphia. Josiah White bought some of this coal and used it in his works. When the War of 1812 was over, anthracite could not compete in price with bituminous, and the mines were abandoned.

In 1817 Josiah White and Erskine Hazard, being desirous of supplying their works with anthracite coal, secured a lease from the Lehigh Coal Mining Co. for twenty years on its whole property, on the condition that after a given time for preparation they should deliver for their own benefit at least 40,000 bushels of coal annually to Philadelphia and the outlying districts, and that they should pay on demand one ear of corn as an annual rental for the property.

On Mar. 20, 1818, by an act of the Legislature, White and Hazard were granted the authority to improve the navigation of the Lehigh River from Stoddartsville to Easton, with instruments borrowed of the Delaware and Schuylkill Canal Co., the only instruments to be had at that time in Philadelphia. Having taken the levels from the river to the coal mines to ascertain that a road could be constructed on a descending grade from the mines to navigation, and being satisfied that it was feasible to make the necessary improvements, the next step was to raise the capital for carrying on the work.

On Oct. 21, 1818, the Lehigh Navigation Co., was formed with a capital of $50,000, for the purpose of making a road from the river to the mines in order to transport the coal to market. The road, including the road to the Summit Mines, was laid out in the fall of 1818 and finished in 1819. It was intended to use it as a railroad as soon as the business would warrant the expense of placing rails upon it.

On Apr. 21, 1820, the Lehigh Coal Mining Co. and the Lehigh Navigation Co. agreed to amalgamate their interests under the title of the Lehigh Navigation and Coal Co., and an additional sum of $30,000 was subscribed to the stock. With this aid the road was repaired and 365 tons of coal were sent to market. This quantity overstocked the market and was disposed of with great difficulty, the price asked therefor being $8.40 per ton. No anthracite coal came to market regularly from any other source than the Lehigh before the year 1825, and the reports of the anthracite coal trade began in 1820, when 365 tons were shipped to Philadelphia.

In May, 1821, the title of the company was changed to the Lehigh Coal and Navigation Co., and the stock of the old mine company was bought up by the new organization. The Lehigh stock generally stood high in the market, as Summit Hill was supposed to be all coal; but when it was learned that the bottom of the coal was found at 60 feet, the value of the stock depreciated 25 per cent.

First Stripping Operation in America

In 1821, 1073 tons were shipped to market. In 1821 a large quantity of coal was uncovered at the old quarry at Summit Hill by removing from its surface 6 to 20 feet of earth and slate. This process was continued until the excavation had a superficial area of 10 acres and a depth varying from 30 to 70 feet. The coal was uncovered and laid open to view, and it was worked in the open as in a stone quarry. The excavation was entered at different points by roads cut through the coal, in some places down to a depth of 70 feet. The vein ranged from 50 to 70 feet in thickness. The covering increased rapidly from the crest of the anticlinal, or saddle, to the synclinal, or basin, and it was found more economical eventually to excavate the coal by the ordinary process of mining by slopes than by the old or original mode of quarrying. This was the first stripping operation in America.

This remarkable exposition of an enormous mass of anthracite for a time excited much attention, not only in the United States but in Europe. It was a scene not presented by any other mining district in the world. For here a single vein reached the enormous maximum thickness of 70 feet, or equal to the workable thickness of the entire formation of the richest coal fields of the old world. This quarry was abandoned in 1847. The excavation, or place formerly occupied by the quarry, will cover an area of about 35 acres, and the amount of coal shipped from it will probably exceed 2,000,000 tons.

In 1822 a total of 2240 tons were shipped to market. The boats used in this descending navigation consisted of square boxes 18 ft. wide and 25 ft. long These boats made but one trip and were broken up in the city and the planks sold for lumber, the spikes, hinges and other iron work being returned to Mauch Chunk by land, a distance of 80 miles.

In 1823 anthracite coal was shipped to the New England states from Philadelphia by boats. In 1824 the Lehigh Coal and Navigation Co. started the great enterprise of driving the old Hacklebernie tunnel. This tunnel was 16 ft. wide and 8 ft. high, and was driven 790 ft. through hard conglomerate rock. The company engineers were under the impression that the coal found in this tunnel would dip to the south, but when the veins were cut it was found that they dipped to the north. The tunnel was abandoned until 1844, when it was completed. This tunnel in 1824 cost $34 per lineal foot. It was the first tunnel of its size driven in the United States.

In 1825 the demand for coal increased so much that 25,500 tons were sent down the Lehigh. The Schuylkill Canal was completed from Port Carbon to Philadelphia and 7143 tons were sent down the Schuylkill. This marked the turning point in the use of anthracite coal. People were now becoming accustomed to the new fuel, and the prejudice against it was fast dying out. The wood stove was beginning to be replaced by the coal stove, and it was during this year that firebricks were made.

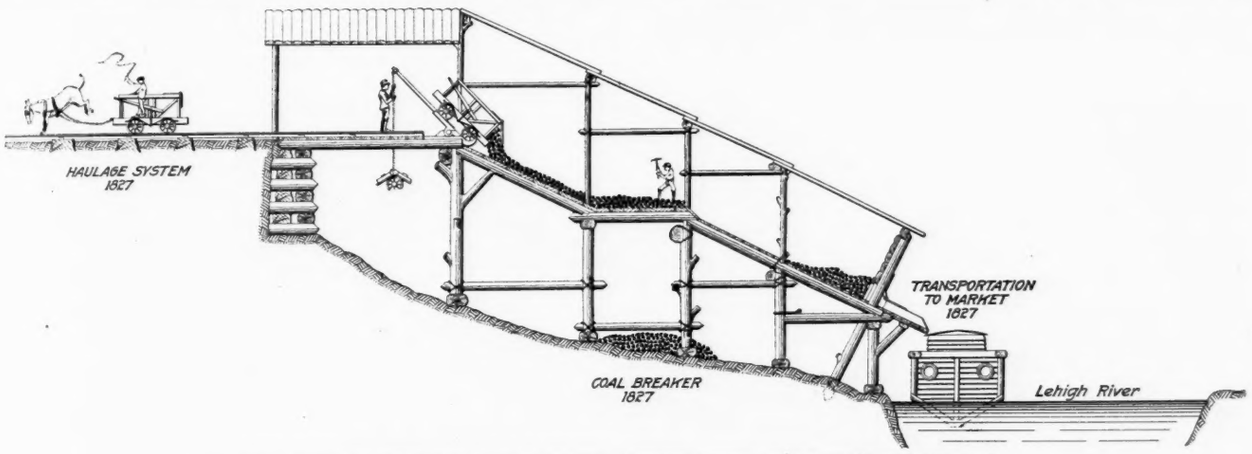
In 1826 there were 31,280 tons of coal sent to market down the Lehigh. The business was now becoming so large that it was difficult to keep the turnpike to the mines in good working order without coating it with stone, and it was determined that the best economy would be to convert it into a railroad. The only railroad then in the United States was the Quincy, made in the fall of 1826, and which was about three miles in length. There had previously been a short wooden railroad about three-fourths of a mile in length at Leibers' stone quarry, but it was now worn out and not in use.

The railroad from Mauch Chunk to Summit Mines was commenced in January and completely in operation by May, 1827. It was nine miles in length and had a descent all the way from Summit Mines to the river. The whole transportation of the coal upon it was done by gravity, the empty wagons being returned to the mines by mules, which rode down with the coal. When the wagons reached Mauch Chunk they were run down a gravity plane to a point near the river, where the coal was dumped into a chute, from which it was loaded into a boat or ark.

When the mules rode down four were placed in a wagon and seven wagons were connected into one train. This was coupled to the coal wagons and made the descent at the same time. The mules readily performed their duty of drawing up the empty cars, but having experienced the comfort of riding down they seemed to regard it as a right, and were reluctant to descend in any other way.

In 1829 the Lehigh Canal was opened from Mauch Chunk to Easton, and from White Haven to Mauch Chunk in 1837. In the same year the Baltimore Coal Co. was organized at Wilkes-Barre to mine coal. In 1832 the little Schuylkill began to be used for the transportation of coal from the Tamaqua region. In 1837 Beaver Meadow made the first shipment of coal. This was followed by Hazleton in 1838 and by Shamokin and Lykens in 1839. In 1834 the Lehigh & Susquehanna R.R. was completed, and in 1846 coal was shipped from the Wyoming region by the Lehigh & Susquehanna R.R. and the Lehigh Canal.

In 1839 Garrett and Eastwick successfully used anthracite coal in their locomotives on the Columbia R.R.



PRIMITIVE METHOD OF LOADING ANTHRACITE INTO BARGES IN 1827

In 1841 Dr. Casenhammer applied for a patent for making pig iron with anthracite. In 1838 it was used for this purpose at Mauch Chunk and Pottsville.

In 1843 great improvements were introduced in the preparation of broken coal. Revolving cast-iron cylindrical crates propelled by steam power were used for this purpose, and improved revolving screens were installed at the landing at Mauch Chunk and were driven by water, assorting the sizes and freeing them from dirt and impurities. The primitive breaker was a sledge in the hands of a brawny workman, who broke up the large lumps for market. It was in this manner that the term breaker was derived. In 1845 railroads were built by numerous companies, and the coal trade began to boom from then on.

It is strange to relate that near the spot where coal was discovered in 1791 by Philip Ginter a slope was sunk in 1847 in the Mammoth Vein, which was 50 ft. thick to the synclinal axis. In February, 1859, a fire, said to be of incendiary origin, broke out and altogether a large sum of money has been expended in the attempt to extinguish it. It has burned a mile in length and 1500 ft. wide, and has consumed millions of tons of coal. The fire is now confined east to the spoon end of the basin by a fire barrier of clay down to the level of the water in the old mine workings.

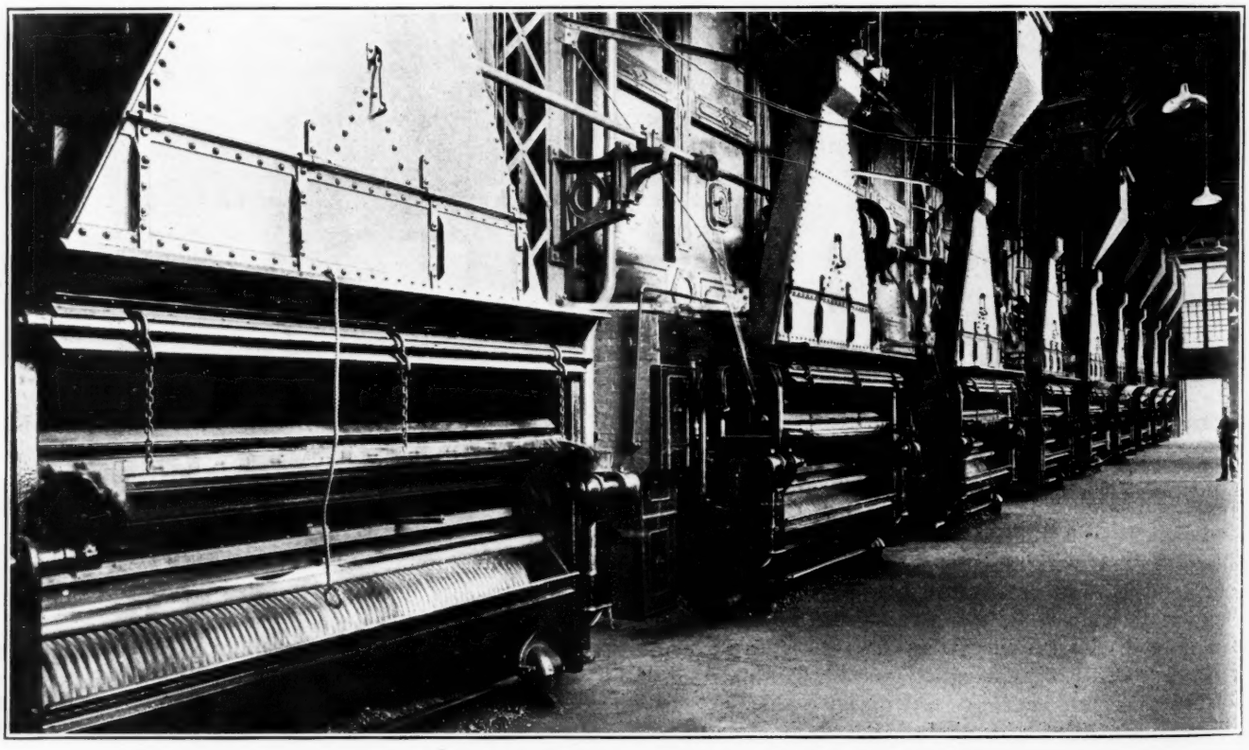
Selection of Stokers at Mines

By T. A. Marsh
Chicago, Ill.

SYNOPSIS — *The selection of stokers for use at coal-mine boiler plants must be made with care. Not only should low-grade fuel be burned, but no change can be made in the fuel if a wrong selection of stoker is made. To be thoroughly successful on low-grade fuels, a stoker should be entirely automatic.*

ALTHOUGH coal at the mines is plentiful and cheap, there is no reason why the practice of economy in its use should be neglected. In fact, there are certain considerations requiring more attention to items of economy in combustion at mine installations than elsewhere.

From an engineering as well as from a commercial standpoint, the selection of all steam-generating apparatus, but particularly that of stokers for coal mines, varies distinctly from the considerations influencing such selections in other localities.



INSTALLATION OF CHAIN GRATE STOKERS AT A LARGE BOILER PLANT

The first and basic distinction is that if the purchaser in other localities selects a type of stoker unsuitable to his ordinary of accustomed coal, he can usually vary his fuel over a more or less liberal ran dependent on the locality. In Chicago he can select from the various grades of Indiana and Illinois washed and raw coals. In Omaha he has a choice of Kansas, Iowa and Wyoming fuels. In St. Paul he has Illinois and Youghiogheny, Hocking and various grades of West Virginia and Kentucky coals from which to select. Correspondingly, practically every market offers some selection, and there is no secret to the fact that many a misjudged choice of stokers has been made to operate successfully through the purchase of selected coal frequently at prices above the minimum per 1000 B.t.u existing for steam fuel.

The coal producer has no such alternative. He is bound to his own coal, and he must select a stoker suitable for its use or admit his error and change the stoker. He cannot change his fuel, although he may at times so desire.

A second consideration affecting the selection of stokers by coal producers is that the stoker selected should be capable of burning the lowest grades of fuel produced at the mines. Culm, washery refuse, bug-dust, No. 5 and, in fact, any combustible mine product not generally salable should be the natural fuel for stokers at the mines. This requires the selection of stokers not subject to clinker troubles. They should possess liberal grate areas and a generous draft supply. Without such provision, the mine plant will be forced to use the better grades of commercial coal, every ton of which has a distinct market value. With proper stokers and engineering, on the other hand, the fuel costs will amount to practically nothing, since a fuel may be used that has no definite commercial value.

A third consideration is that a type of stoker should be installed that is best adapted to the fuel, in order that the coal company's sales and engineering organiza-

tions may become familiar with the possibility of burning the various sizes and grades of steam coal that are produced and in order that they may be fortified with facts obtained from their own company's power plant. If anyone ought to know the characteristics of a fuel, it is the producer of that fuel; and if he cannot select a type of stoker that will give good furnace conditions, what hope is there for the purchaser of this coal with only a casual knowledge of its properties and behavior?

A final but not to be neglected consideration is that the record and appearance of the mine power plant as well as the fact of burning the poorest grade of coal produced at the mine should be positive sales arguments for the fuel. What can be more convincing to a prospective purchaser of 1¼ in. screenings than figures showing him combustion rates, evaporation and horsepowers developed with this same fuel, and at a plant where he may be taken at any time for a thorough inspection of firing conditions.

The mine plant should therefore be a well designed one—in fact a "show" plant. Complete records should be kept of results; but above all, first, last and always, the correct type of stoker must be selected. The producer cannot take a chance with clinker-producing stokers. These would at once condemn the fuel. Let others who have a wide coal market experiment with stokers which involve a selection of coal on the basis of fusibility of ash. The producer cannot take a chance. He must use good engineering, which is simply common sense.

Mine Plant Stoker Should Be Automatic

The stoker for a mine plant should be automatic. It should feed the coal, burn it, discharge the ash and keep the air spaces in the grate always ready for the fresh fuel. Few types of stokers are strictly automatic; most of them push coal into a furnace and trust to someone to dump or pull ash, clinker and live coal out at a later date.

A stoker well adapted to low grade fuels as well as being low in operating cost and absolutely free from clinker trouble is the chain grate type. With the chain grate, coal is fed and burned; the ash is discharged to the pit and the air space automatically cleaned for the incoming fuel.

This type of stoker has been developed for and has been demonstrated to be well adapted to mine use with high ash clinkering coals. Originally designed for free burning coal, popular demand required a chain grate design for the coking coals. Accordingly, the "L" type chain grate was developed, embodying the chain grate principle of ash discharge and cleaning of air space with the breaking up action required by coking coal. Both types of these stokers have produced unusually high operating efficiencies and capacities. They are distinguished by freedom from clinkers, low labor and maintenance costs.

The plant at the mine is a problem by itself and cannot be judged by the usual considerations. A full appreciation of the problem and of the possibilities of a proper installation will lead to better plants and a greater return on the investment, not only as regards saving in fuel, but also as regards the marketing of steam coal.

Great Britain Relies on Foreign Countries for Supply of Mine Timber

By Mark Meredith
Liverpool, England

Lovers of the out-of-doors who wring their hands over the stripping of Britain's woods know, of course, that there is a patriotic necessity for the havoc, but they probably hardly realize how urgent the need is. Some facts in respect to England's position in regard to pit wood will enlighten them.

In the first place it has to be borne in mind that as one of the greatest coal producing countries in the world Great Britain is also one of the greatest consumers of pit wood. During the five years, 1909-13, the consumption of pit wood in the United Kingdom was about 3¾ million tons per annum. In 1913 it was roughly 4¼ million tons. For the greater part of this Great Britain had to rely on foreign countries, only 750,000 tons being home-grown timber.

Thus in normal times Great Britain imported some three million tons of timber per year. Of this over 1¼ million tons came from Russia, 820,000 tons from France, 446,000 tons from Sweden and Norway, and 392,000 tons from Spain and Portugal. As none was imported from other parts of the Empire, it will be seen that for at least 80 per cent. of its supply of pit wood the United Kingdom is dependent on foreign countries, a dependence that although, as it happened, was confined to the Allies and to neutrals, quickly proved unsatisfactory once war broke out.

It soon became evident that the supply, particularly from the Baltic, would be curtailed, and inquiries were therefore made with a view to ascertaining whether some part of the deficit could not be made up by obtaining supplies from Newfoundland and Canada. The Board of Trade representative on the mission of inquiry reported that there is an almost inexhaustible quantity of timber in certain parts of Newfoundland and the Maritime Provinces of Canada, much of which could be made available for pit props.

The real factor as to quantities procurable from these sources resolves itself into a question of cost of carriage. At the present moment, however, the question is not one of cost of carriage, but of the practicability of carriage.

Probably the cost of carriage had a deciding influence in 1915, when the shipping difficulties had not become so acute, for in that year, while the quantity of pit wood available from Canada and Newfoundland was 950,000 tons, less than 100,000 tons of it was actually imported. Newfoundland's share was 86,000 tons, which shows that the Canadian resources had scarcely been tapped. Grim necessity has compelled Great Britain to strip her own scanty timber resources, while the extended use of steel and concrete props in substitution for wood, especially on main roads and airways, has also helped Great Britain mines to continue operations.

If Great Britain must go abroad for her supplies after the war, it is to be hoped that her resources within the empire will not be forgotten, although it must be admitted the cost of carriage will not be a negligible factor even in normal times. It has been estimated that Newfoundland could eventually supply at least some 7[illegible]0,000 tons annually, and Canada much more.

Mining Institute Discusses Anthracite Prices

THE winter session of the American Institute of Mining Engineers (now, by the way, to be known henceforth as the American Institute of Mining and Metallurgical Engineers) was made notable by the paper of R. V. Norris on anthracite mining costs. As some of the speakers pointed out, many of the more important facts of the anthracite situation lie deeply hidden in Mr. Norris' figures. E. W. Parker, director of the Anthracite Bureau of Information, in his remarks called attention to the fact that 25 per cent. of the whole production of anthracite was priced at so low a figure that it had to be sold below its actual mining cost.

It was stated that when increases in wages were made the prices were advanced less than the computed average increase in costs due to the wage increase. The advances made no allowance for increases in the cost of materials that the operator had to purchase and, as said, only partially met what had been figured as the probable average increase in the cost of production.

Unfortunately, after one increase in wage when the adjustment was figured as 45c., the actual increase given was only 35c. It proved, however, that the increase should have been over 70c. The efficiency of labor probably had much to do with the miscalculation, for even though patriotism did a great deal to make the men willing and efficient workers, it could not give old men the energy of youth, or newly employed men the dexterity of the experienced. The young men and the experienced were being continually withdrawn leaving less capable men to take over the burden.

Sixty Per Cent. of Anthracite Mined at Loss

S. D. Warriner, president of the Lehigh Coal and Navigation Co., declared that 60 per cent. of the anthracite coal was being mined at a financial loss when all charges were considered, including depreciation, depletion, a reasonable interest on investment and Federal taxation. He said that only the fresh-mined coal should be considered in sizing up the situation, and that his estimate of 60 per cent. would be inadequate during the period of slow work now upon us.

An attack being made upon the preparation irregularities during the war, Paul Sterling declared for the company of which he is mechanical engineer (the Lehigh Valley Coal Co.) that it had maintained its standards inviolate throughout that period of stress.

R. V. Norris said that the anthracite mines had been conducted during the war with production alone in view. As a result development had suffered and the anthracite companies were faced with a large expenditure for the extension of tunnels and gangways.

Edwin Ludlow declared that enlistments of the men, especially in the mechanic class, had reduced the efficiency of labor. Some men also had taken advantage of the fact that the company was unwilling to discharge anyone who would work even supinely during the period of the war. The right of discharge had practically rested as an unused corrective ever since the United States entered the conflict. Increases in wages had produced not greater efficiency, but in too many cases the reverse. The output of certain collieries, he stated, had declined during the war 0.26 tons per man-hour, despite all efforts to increase unit output.

He said that a certain corporation having a payroll of about $8,000,000 a year had to pay an increase of $3,000,000 a year to labor. To meet this large sum it had been allowed to charge an increase on prepared sizes of $1,500,000 per annum. Thus $1,500,000 of a loss was incurred. However, there seemed a hope that this loss might be in part averted, for the business in steam sizes was then brisk and profitable. But the profit from steam sizes was wiped out by the increased cost of material, which loss alone was $960,000.

He prophesied that the survival of the fittest would wipe out many anthracite companies and operations of size and importance, which before the war were able to exist. With post-war conditions, unless prices were raised, they would have to close their operations. Should such a closing down result, there would be a runaway market this fall, for it is absolutely necessary that the fittest and the less fit in the anthracite industry be alike kept in existence if the urgent needs of the public are to be met, during and before any normal winter.

Inequitable Rates Put Mines Out of Business

It may here be said that an increase of prices equivalent to the *average* advance in wages cannot be made with fairness to the higher-cost operators where the difference in difficulties in operation are as large as those existing in the anthracite region. Large changes in wage rates thus inequitably adjusted cannot do otherwise than put a lot of carefully managed mines out of business—mines which the public is most anxious to keep in active operation. The correction for increased average wage costs in the anthracite region was not so readily made as in the bituminous region, where the estimate proved itself correct with but 1c. of error.

James B. Neale read a paper on the "Work of the National Production Committee of the U. S. Fuel Administration," and said he hoped that the efficiency of the operator would be increased by moral considerations and by a continuance of the work of the new production committees or something equivalent thereto. R. Dawson Hall stated that the economic basis of industry prevented the operator from yielding to those moral impulses toward efficiency as often as such moral impulses called on him.

The day laborer, if asked to do a larger and more efficient day's work, may do so because the appeal does not ask him to give anything entailing any loss. He works no more hours than he would if working less efficiently and he receives no less pay than he would if he loafed on the job. His efficiency, therefore, does not hurt him in any manner unless he is the kind of man to whom work is painful and abhorrent. The miner, on the other hand, when asked to be efficient, being on piece work, is sometimes quite willing, and indeed why should he not be? Efficiency, and the resultant increase in output, is reflected in his higher wages.

When, however, the operator tries to become so efficient that the miner gets all the cars he needs and all the cutting and loading facilities he can use, then there

has to be an excess of equipment, power and day labor. So efficiency in dealing with the miner means inefficiency as far as economical production of coal is concerned. The manager is confronted with larger costs of production, as his efficiency in supplying cars to miners is such an expensive matter to the company that he realizes that for him and the corporation it spells only a financial loss such as will inevitably be classed as inefficiency by the company.

The same is true when more efficient machinery for the undermining, drilling, face conveying and loading of coal is provided. There is also but little reward for the company which double-tracks rooms and headings to promote speedy car delivery or which introduces instantaneous ventilation and room car-pullers and electric lighting to facilitate the rapid extraction of coal.

Large tonnage, however, we are told spells low overhead. It does, if the orders are available and the miners will work a full day. If, however, the miner gets a frequent turn and every mining advantage, he is apt to come out at noon and so make the overhead come to the same percentage of production cost. But if he works there are apt to be more days of idleness, and the overhead charge again makes trouble.

Inefficiency in delivering cars to the miner is likely to continue until such time as the miner is paid wholly or partly by the day and not by the ton alone. With payment by the day, or partly by the day, the operator will not be complacent when he sees a miner waiting for cars, any more than he is happy in his mind when he sees a motorman lolling at the parting waiting for the arrival of gathering locomotives. Every efficient operator will then have his appropriate reward.

Nowadays the operator who gives the miner a generous car allotment and other equipment and power advantages soon realizes that his generosity is making him a weak opponent, in the market, of the man who seeks only to get out his coal at the lowest cost regardless of the desires and requirements of the enterprising miner. He also finds his day men disgruntled at the few hours in the working day that the average miner employed on the ton basis is willing to work when given prompt car service. There was no time for the discussion of these remarks by the assembly, but the Chair, R. V. Norris, registered the customary disapproval of such revolutionary remarks.

S. A. Taylor read J. D. A. Morrow's paper on "Distribution of Coal Under the United States Fuel Administration." Shortage of time, unfortunately, prevented a discussion of the paper.

The visit to the Federal shipping plant located at Kearny, N. J., occurred on the following day, Thursday, Feb. 20. The Federal Shipbuilding Co. was formed July, 1917, by the United States Steel Corporation, in order to assist in the great shipbuilding program being carried out by the United States Shipping Board for war purposes.

The plant is situated on the west bank of the Hackensack River, and comprises about 185 acres of land, originally a marsh which was practically covered by water at high tide. About 750,000 cu.yd. of fill was obtained by the excavation of the wet basin and by the dredging of the Hackensack River, after which a final top fill of cinders was applied.

The first pile was driven on Aug. 6, 1917, and the construction work was prosecuted in a most energetic manner, despite the severe winter and other difficulties. All of the facilities and organization of the United States Steel Corporation were generously placed at the service of the Federal Shipbuilding Co., which accounts for the remarkable and substantial progress made.

The plant is entirely self-contained, having 12 ways and a fitting-out basin capable of accommodating eight steamers at one time, besides the necessary workshops for carrying out every detail of manufacture required in ship construction.

Special attention has been paid to welfare work and safety appliances, as in the other subsidiary companies of the corporation. The first keel was laid in November, 1917, and up to the present time nine boats have been launched and six delivered. The sixth left for trial on the morning of the visit. These steamers are 410 ft. over all, 55-ft. beam, with a deep draft of 27 ft., carrying 9600 tons of cargo, and they will make a speed of 11½ knots loaded. Tests on the unloaded boats have shown a speed of 13 knots. Satisfactory results have been given by all the vessels delivered, and the boats are a fine type of the modern economical cargo carrier.

In order to make the greatest possible progress under war conditions, about 60 per cent. of the first thirty steamers was fabricated by the American Bridge Co., and sent into the plant all ready for erection; the remaining portions, consisting of the two ends, were fabricated in the plant.

During the early part of 1918, extensive preparations were made for carrying out experimental electric welding with the view of building steamers without rivets. This work was under the charge of the Emergency Fleet Corporation's Experimental Section, but on the signing of the armistice operations were suddenly stopped, and the equipment for electric welding is now dismantled and shipped away.

No attempt has been made to cover all the features in the program as the outlines of the occasion were duly covered in the advance notice published in the issue of Jan. 30, page 237. This early draft of the program was closely adhered to.

Kentenia Coal Sales Co.

In the Feb. 20 issue of *Coal Age*, p. 383, there appeared a news note stating that the Kentenia Coal Sales Co., of Pikeville, Ohio, had filed a petition in voluntary bankruptcy in the United States Court at Cincinnati. The coal company in question calls attention to the fact that this information is wholly incorrect. It appears that the Kentenia Coal Sales Co. is entirely solvent and is conducting a prosperous business. Our correspondent finds on investigation that the error grew out of the fact that the Kentenia Coal Sales Co. was one of three petitioning creditors who filed an involuntary bankruptcy petition against a Kentucky coal corporation. The news reporter who originally supplied the information to the *Coal Age* correspondent evidently did not know the difference between a petitioning creditor and a defendant in an involuntary bankruptcy proceeding. The error is regrettable, and *Coal Age* is giving the facts this prominent display in order that no injury shall result to the Kentenia company from the mistake.

Opportunities in South America for American Coal

As a result of the war, conditions are especially propitious for the extension of the American export coal trade to South America. This is the firm conviction of Grosvenor M. Jones, the assistant chief of the Bureau of Foreign and Domestic Commerce, who recently returned from a trip to South America, during which he made an intensive study of the region with respect to markets for American coal.

With the expansion of American foreign trade, which must come if the nation's ambition with regard to the merchant marine is realized, must come also an increase in sea-borne coal, in order to balance the freight movement. If American ships are to compete successfully with foreign shipping, means must be found to have cargoes each way. When one leg of the voyage must be made in ballast, the costs of operation become prohibitive for most trade. It has been said that English coal has made possible that nation's merchant marine. Conditions now have changed so as to limit the amount of English coal that can be sent to South America, while the United States is in a more advantageous position than ever to enter those markets. It frequently has been pointed out that France never can have a great merchant marine, since it cannot furnish the required bulk of outbound cargo. This does not apply to the United States, and it is to coal and to other products of the American mines that American exporters are looking to furnish the major part of an outbound freight.

Latin Americans, more than any other peoples, adhere to established customs in the purchase of goods. During the four years of the war they were forced to get their coal supplies from the United States. This has afforded an opportunity for the introduction of American coals into South America, and now that Latin American consumers have become accustomed to the fuel there is every reason to believe that the market can be retained.

While Cuba will continue to be the most important Latin American market for American coal, that of Argentina should rank a close second, Mr. Jones believes. The Cuban market has been made, to a large extent, by the activities of American enterprises. Capital from the United States is becoming increasingly interested in Argentine developments, which will make it easier to expand the demand for American coal; but during the war the almost unassailable preference for Cardiff coal on the part of most of the other consumers of fuel has given way to a decided appreciation of Pocahontas coal. Pocahontas coal was put to an exacting test by the Argentine Railways, with a most satisfactory result. The wide grate bars in use in South America make it advisable, Mr. Jones states, to screen the coal more carefully than has been the American custom. It is his opinion that the example of the English should be followed and all export coal be screened carefully at tidewater, where the fine material could be converted into briquets.

Briquets are popular throughout Latin America. Many consumers will buy nothing else. Fuel in this form can be piled up regularly, making pilfering easy of detection. This latter feature is one of great importance to Latin American coal consumers. With the price of coal high and with a general tendency toward pilfering among the lower classes, the safeguarding of the fuel pile is important and oftentimes difficult.

While two American companies, the Consolidation Coal Co. and the Pittsburgh Coal Co., are well entrenched at Buenos Aires, Mr. Jones declares it is absolutely necessary to pool interests under the Webb Act if the American producers are to capture a substantial part of the South American market.

Argentina offers a particularly promising field, in that the extension of railroad lines and the increasing demand for coal for industrial power plants will make continually for a greater market. The bunkering trade, already important, also is expected to assume greater proportions.

Montevideo, which is at the mouth of the Rio de la Plata, is better situated than are other Plata River ports. It is destined, many believe, to become an important bunkering point. It is easier of access for vessels of great draft, while the congestion that often exists at Buenos Aires is not met at Montevideo. In addition, there is an increasing demand for coal for use industrially in Uruguay. Brazil, Columbia and Venezuela offer less important east coast markets, but their needs as well are increasing along with the extension of railroads and construction of power-consuming public utilities and industrial plants.

West coast markets are not so promising as are those on the east coast, but in the aggregate a considerable tonnage of coal is consumed in those countries each year. Much of the bunkering trade on the west coast has fallen to the United States, because of the splendid facilities operated in connection with the Panama Canal.

The development of American mining enterprises has added greatly to the amount of coal imported, particularly by Chile. The great development in copper and iron requires large quantities of fuel. The transportation of these raw materials, as well as of tin and other products, requires a large amount of tonnage. These ships, on making the return trip from the United States, afford the service necessary to lay down American coal at west coast ports at prices that will compete with Australian coals. Since the amount of coal taken by the returning ore ships would be too great for any one port, plans are being made for the installation of the best of facilities at a central point from which the coal can be transshipped to smaller vessels and delivered at the numerous points where the coal is needed.

Fuel oil has been used extensively on the west coast of South America. The increasing price and the tendency on the part of American producers to make less fuel oil, in favor of the more valuable byproducts, are causing them to use less of that fuel.

Mineral Leasing Bill Talked to Death by Senator La Follette

The mineral leasing bill, which provided for the leasing and sale of coal lands on public domain, was talked to death by Senator La Follette, of Wisconsin. After the measure had passed the House and the Senate and had been the subject of long deliberation in conference, it was caught in the legislative jam of the expiring session. Even then four hours of the precious time was allotted to the discussion of the conference report. The greater part of this was used by Senator La Follette, who declared he was prepared to continue indefinitely. There were 65 votes pledged in the Senate for the measure, which insured its passage by a comfortable majority, had it been allowed to come to a vote.

Few bills have traveled a rockier road than have the measures providing for the leasing of mineral lands. Similar measures have passed the House and Senate on three occasions. The bill just killed, however, was the first on which the conferees had agreed. In fact, Senator Smoot, of Utah, was the only one of the ten conferees who objected to the conference report.

Senator Vardaman Scores the Anthracite Coal Operators in Report

Interference on the part of the Federal Government to divorce the transportation companies from the mining companies in the anthracite region of Pennsylvania is recommended in a report submitted to the Senate on Mar. 3 by Senator Vardaman, the chairman of the committee which has been investigating the coal situation.

The report points out that 72 per cent. of the anthracite is produced by eight transportation companies, "notwithstanding the fact that the constitution of Pennsylvania prohibits a transportation company from engaging in mining."

One of the things declared to have been proved at the hearings is that the Susquehanna Collieries Co. has taken over the Pennsylvania companies.

Much emphasis is laid upon what is termed the "dog-in-the-manger" attitude of the companies in reaching out for more leases when their own properties are to a great extent undeveloped.

The Fuel Administration is criticised for not using its "despotic" power to compel the reclaiming of coal from culm banks.

The Girard estate is being operated so as to be a curse to the householder, the report declares. It fixes the standard for high royalties, it is said, which makes for the condition wherein anthracite royalties are ten times those levied against bituminous lands. Royalties and freight rates need the attention of Congress, the report asserts, together with the "underlying cause of it all that one group of financiers control the anthracite production of the country.

"It is unfortunate," the report continues, "that the Federal Government cannot take control of coal mines and operate them for the benefit of all the people. The price of coal should be fixed by the Government and a fair return on investment also should be vouchsafed."

Deputies Named to Continue Compilation of Coal Traffic Statistics

W. D. McKinney and F. C. Honnold have been named deputy directors of the Bureau of Statistics of the Fuel Administration. This has been done so that they may continue the compilation of coal traffic figures along the lines formerly followed by the Ohio Bureau of Coal Statistics and the Illinois-Indiana Coal Traffic Bureau. These bureaus were railroad organizations. They were abandoned when the Government took over the roads. The work was taken over by the Fuel Administration on Apr. 1, so that necessary statistics could continue to be made available. In order that statistics for the entire coal year may be had, the work will be continued until after the March figures are all received.

Coal Seams in Matanuska Field Badly Broken and Faulted

Discussion of coal in Alaska brought about by the debate on the leasing bill led Secretary Lane to make the following statement in regard to the Matanuska field:

Two leases have been entered into by the Government, one with Lars Netland, a miner, who has as a backer Mr. Fontana, a business man of San Francisco, and the other to Oliver La Duke and associates. Neither of these parties has any other interests of any kind, so far as is known, in Alaska or any connection with any railroad, and neither of them has been successful in developing any large amount of coal. There are many thousands of acres in this field which are open for lease and which will be leased to any responsible parties who will undertake their development. There is no possibility of monopolizing this field, even if someone wished to do so, for the Government reserves are kept to be operated in case such monopoly should arise. Thus far, however, the Government in operating its own mine has been no more successful than the private lessees, for the coal is so badly broken and faulted that exploration work to follow the seam must be undertaken before development work can be wisely done. And this is being undertaken. Government experts who have examined this field do not promise without further exploring a larger output of coal from this field than 150,000 tons a year.

Problems in the Merchandising of Coal

By George H. Cushing
Managing Director, American Wholesale Coal Association, Washington, D. C.

IT IS a curious fact in American life that no man is expected to talk disinterestedly, or is believed capable of doing so, unless he is a United States judge. The latter is presumed to be truthful because, assumptively, he is supposed to have been bought off for life. All others must stand to have their words discounted on the theory of personal interest. Even presidents of the United States are not excepted. Their discussions are presumed to be tainted with that self-interest which has to do with an extension of term.

So, I suppose that when I discuss coal merchandising my word will be discounted liberally on the theory that I am talking the way I am paid. Even so, there is one most excellent reason why I cannot speak as I am supposed to do—for the coal jobbers. There are no coal jobbers any more. They all disappeared last November. They eliminated themselves from the earth to get rid of the stench of having been classified as purchasing agents. Therefore, since I cannot talk for some one who does not exist, I am not pleading for the jobbers.

Instead, I speak only for the "wholesalers." That is a most generous term. It embraces all who distribute coal in carload lots.

If by some process I may be allowed to divest myself of so mystifying a connection, and if permitted again to assume the rôle of a private citizen deeply interested in the safety, the welfare and the sanity of coal, I would like to discuss the Foreword on coal merchandising in the Feb. 13 issue of *Coal Age*.

It advised all coal operators to study carefully their merchandising programs. In that recommendation I concur most heartily. Nothing is more needed. Nothing that can possibly be done will pay bigger or surer dividends on the outlay. So, I say the recommendation is wise and sound.

Objections to Eliminating Existing Selling Machinery

But, if the further argument of the editorial means to advise operators to throw away the old selling equipment and install a new and untried system in these times of grave distress in coal, I ask leave to disagree. It isn't safe. It isn't good business.

My objection to that proposal is based on a common practice in business, to wit: No new piece of machinery, no matter how advanced in design or how economical in operation, ever completely and instantly supplants the old. Instead, there is always a period when the old is a receding factor and when the new is coming more and more into its own. This is so out of respect for the fact that it cost money to establish the old machinery and that it still is capable of some service, before it is junked. It is out of respect for the further fact that the new machine is untried. It must be given time to correct its small defects and to have its running parts smoothed off by use. Changes in machinery are made gradually, at least by careful men.

What is true of the machinery of a factory must be equally true of selling machinery of a coal mine. The new must have time to prove and perfect itself. The old must have time to liquidate its value.

I must demur, therefore, to the theory—now commonly expressed—that the so-called middleman in coal can be supplanted instantly. I do so on several accounts. Not the least of these is that it is no more safe to destroy one system of selling in the hope a better one will grow in its place than it is safe to adopt the principles of Bolshevism and destroy one form of government and one social order in the hope that something better will grow in its place. I say the two ideas are one. And, I say that both are equally and terribly dangerous.

This does not even pretend to say, however, that there is no room for improvement in the methods of selling coal. There is, in fact, both room and need for a revolution, or as near to it as we can get. One fact alone stamps the coal industry as deficient in this respect. We have no Marshall Field in the coal business. We haven't even a John Wanamaker. Certainly we have nothing approaching the Crane Company. There is not only plenty of room for one, but the coal trade will be behind the procession until it gets something of the sort.

A Few Beginnings in the Right Direction

We have, it is true, a few beginnings in the right direction. Williams & Peters are great merchants—in their line. They have been so for many years. But, their field is limited to a few grades of coal and that reduces their standing to less than that of a truly great house. The same, almost precisely, is true of the greatest coal merchandising house of them all—the Berwind-White interests. Its field has been too small even though its methods are great. Castner, Curran & Bullitt started toward true greatness in coal selling. Unfortunately, they stopped halfway to real achievement because they allowed their efforts to be confined mainly to one grade of coal. The Golbe Coal Co. could have become a real merchandising house if it had continued as it started. It is headed by a big man and a real merchant. It had the right policy. But, it fell short only because its head allowed himself to be tempted to scatter his fire by becoming interested in other things. And, so it goes through the list. Coal has some good merchants but no great ones. It needs great merchants.

The reason for this lack, as I believe, is that coal men as a class have never studied the sales end of their business to get at the essential facts about their merchandising program. For example, no one knows what amount of annual tonnage will support a private selling organization and what amount of annual tonnage will not. We do know that a man with ten million tons of annual output should have his own sales force. We know that a mine with 100,000 tons annually cannot afford it. But, where the dividing line is, we do not know. No studied effort has been made to find the facts. Still, that information should be gathered.

Again, it is obvious that a man who has less than 100,000 tons of coal a year to sell cannot travel over a big territory at his own expense. It would make his selling cost per ton too high. But, we have not the slightest idea how big is the territory over which a selling force can travel, economically, to sell an annual tonnage of a million or five million or even ten million tons. That information surely is necessary.

Further, it is assumed broadly—but without anything more than assumption behind it—that a man with an assortment of coals in his catalog can afford to travel a bigger territory than can the man who has the same tonnage of but one grade of coal. That may be true. Again, the likelihood is that it isn't true at all. A careful study of the facts might disclose that the man with the assortment of coals could make a bigger and surer selling record at less expense and at greater net profit to himself by the intensified cultivation of a much smaller selling zone.

It is along these lines that the trade needs to study if it is ever going to get that improvement in its selling efforts and that economy in selling which the trade must have. Seeing how much remains to be learned about the simplest things in coal merchandising, there is evident need for careful study and painstaking inquiry.

But, so long as we remain in the dark on these fundamentals, I cannot agree that the trade is ready to try any such dangerous experiment as to throw away its old selling system and to try a new one built on the old pattern.

So long as we remain in ignorance of correct coal merchandising the present mood of the trade to experiment on the selling question is closely akin to that of the child who tears up a toy to see what is inside it. It is both dangerous and destructive.

A Plague of Associations

By N. H. Seaburg

Boston, Mass.

During the past year and a half the coal industry has been swept with a plague, an epidemic of associations, every one the panacea for whatever exigency the constantly changing situation developed in the trade. Each little perplexity had its own particular mushroom panacea—a new association. The mere formation of an association seemed to allay the anxiety of those individuals interested, even if no cure was effected by it. It was felt that action had at least been taken, which was in itself some relief. Oftentimes the evil which had brought the association into existence disappeared or was eradicated long before the duly ordained committees had begun and, in the majority of cases, finished their investigations.

It is surprising to note how few the associations are that survived, if we disregard the blatant pretensions of the tail-ends of several which are desperately trying to maintain their identity. Indeed there are not many more of any real significance now than there were before the plague. But while this may be true, it is equally true that the trade as a whole has been greatly benefited by this epidemic of associations. It has brought home to every person engaged in the coal industry that greater and more substantial progress can be achieved by association and unity of interests than by individual action. And this lesson is well worth the price paid in hours and hours of valuable time spent in useless talk and vain efforts to remedy fleeting emergencies.

In consequence of the fact that the coal business is so broad in scope, competitive and antagonistic trade methods have been the rule. Any form of coöperation has always been looked upon with suspicion and disfavor. Perhaps of all business men in the country coal men are the most suspicious of their own kind—or have been until recently. "Mind your own business" has been the Koran. While this may be an excellent policy in personal affairs, the intricate civilization of today has outgrown it, particularly the business world. Interdependence is the fundamental support of society. We are today witnessing the greatest nations of the world struggling with this important problem in an effort to establish a League of Nations.

So, likewise, though in a lesser degree, the individual members in the coal industry are tentatively seeking to work out some program of associated effort that will be advantageous to all. The actions so far are somewhat half-hearted, due mainly to a lack of confidence, but this is to be expected. It will be overcome just as soon as the officers and members of sound associations realize that in order to be successful and efficient they must work just as hard and give just as much of themselves to the business of the association as they would and are doing in their own private undertakings.

Patronage is not worth a tittle if it is not backed up by something substantial. There has been too much of this kind of shirking. If the man and his ability and organization are not behind the name which he lends to the support of an association, then it may as well be withdrawn; it means nothing. Active work is what counts and brings results. Letting the other fellow do it is a human quality, but no healthy business has ever been founded on such a policy.

Also, there should be more concentration and less dabbling with every panacea that some well-meaning but unnecessarily alarmed person suggests. In union there is strength and efficiency, while "too many cooks" simply hamper the efforts of every one else. Strong and practical associations are the order of the day, but a plague of them should be avoided.

They Shiver in Paris for Lack of Coal

By Mark R. Lamb

In Paris, we are cold, but will be colder. The coal is of poor quality, anyway. Many slack heaps in Pennsylvania are coarser than the best grades delivered here. From this it will be seen why any kind of briquet is acceptable. It is a fact that large rectangular briquets are still made. They are stacked carefully each time they are moved. Then when used they must be broken by hand. The small oval briquet is in evidence, and when properly made is in great demand.

The heat is turned on in the hotel morning and evening for an hour, but now that the Peace Conference is on, we keep warm (with rage) wondering if the Germans are to be paid their war expenses. In Paris the men are happy enough, but one sees too many sad-eyed women in mourning. Who will pay *them?*

EDITORIALS

Your Services Respectfully Solicited

LIBERTY BONDS are being sold extensively throughout the country, as can be seen by the quotations on the various Stock Exchanges of the Nation. Unfortunately, there are few persons who are seeking to buy Liberty Bonds from the original purchasers, and many who are trying to sell. A decline has been inevitable under these circumstances; but as prices fall the bonds become increasingly desirable.

The present price for $100 Liberty Bonds paying 4¼ per cent. ran, on Feb. 27, between 94.14 and 95.54. The regular brokers having seats on the Stock Exchange will market these bonds for $1 a bond and $50 bonds for 50c. Thus a $100 bond will yield about $93 to the person who sells it. There is therefore no need for any man to sell his bonds at a large sacrifice.

The operator should buy the bonds from his employees at par or at the market price, or else buy them for a dollar or so below the market and sell them through a broker. The first plan is the best where the operator has the money. In case the workingman should be suspicious, the operator should post conspicuously the quoted rates as recorded in the public prints day by day.

Confidence would be increased if the operator did his utmost to argue the employee out of a purpose to sell his bonds when necessity did not so dictate, especially if the operator would post notices asking the men to hold on despite the short working week and ill health. It would be further increased if the operator would sell the bonds thus received as far as possible to local purchasers and at the price at which they come to his hand.

Financiers have at no time been surprised that bonds have been selling at a low figure. That was the experience in every foreign nation. Everyone knew that the reason for this fall was not the doubt that any nation would redeem its bonds, except in the case of Russia, but rather the fact that while patriotism will buy new bonds it will not always keep them; and it will not buy bonds that persons have bought and disposed of for good reasons, or for reasons not so adequate.

There has been a disposition among those who have never bought bonds before to say that the Government has not kept its word. This is, of course, an unreasonable argument. The Government only agrees to pay the bonds off when they become due. It might be truer to say that the bond holder who tries to sell has not kept his contract with the Government. The face of the bond shows that the purchaser lent the money to the Government for the time specified thereon. He now wants it before that time, and he it is who has not kept his word. If he has to sell his bond before the time, owing to difficulties in handling his finances and meeting his bills, then he is excused; but he must be contented to suffer the loss just as he has to do when surrendering his life insurance.

However, there is no need to rob the wage earner of three-quarters of his savings, as some sharks (not in the coal business, we trust) have done. The operator can handle the bonds and get the mine worker at least 92c. on the dollar, and thus show his good will to his employees and the sincerity of his patriotism.

The operator felt himself in duty bound to try every expedient to sell the bonds. He should be just as anxious now to uphold the national credit in the selling of them. Should, however, any man sell his bonds for liquor or other foolish thing, the less he gets for his bond perhaps the better it is for him. Yet such a man will be the first to declare that he has been unfairly dealt with. The hour to sell Liberty Bonds in order "to have a good time" is certainly not now, and it is doubtful if at any time it is a wise and good thing, or even a patriotic thing, to sell for self-entertainment a bond that represents a part of the national savings.

Operators should help to restore business by urging public improvements of a worthy character. When business hesitates, the municipal, state and national governments should bare their right arms.

Some Unrecognized Uses of the Wealthy

THE fare from Mt. Vernon to Coney Island, 29 miles, is a nickel. The public seems satisfied with that fare though the company is not. The fare on the railroad is 3c. a mile, or 87c. for 29 miles. The people are temporarily contented with that fare but would not consent to its being raised.

The public, then, is willing to pay 3c. a mile or less. Would it be willing, as a whole, to pay $1 or $1.50 a mile? It is unthinkable at present. A few wealthy men fortunately will put down their $100 to go 100 miles by aëroplane, and the art of flying will be developed, till the price falls to a level that workmen can meet.

So it has been with every development. Bicycles were manufactured for the well-to-do long before they became the recognized steed of the messenger boy. Automobiles were purchased for $20,000 for a long time before the Ford and the runabout took Guiseppe Sartor to the mine mouth. The rich are the pioneers. If there were none there could be no progress. In the wasteful economy of nature, the wasteful man is a necessary part, just as much as the wasteful water current and wasteful mountain breeze.

Nearly all developments come from the encouragement given them by the well-to-do. All improvements are tried first by them and on them, and then, when proved and standardized, they bring their benefits to those less fortunate. It is not a coincidence that Australia, that has no extremely wealthy people, has contributed little to the world. Admirable men and women.

their continent is a place apart. It cannot lead because of the dead level of the population. Art, invention, enterprise—all depend on wealth, though wealth without discretion and frugality is as unfortunate as poverty.

The luxuries of the rich soon become the necessities of the poor. Oranges, lemons, spices, bananas, were at one time luxuries. Who will so class them now? Their sale has stimulated industry, so that the rarity of the past has become the commonplace of the present.

Supply and demand regulate prices, and supply will fail as well as demand if the price is made so low that there is no profit in production. Goods on shelves may have to be given away if the demand ceases, but coal in the hill need not be disturbed if the price is inadequate.

A Clever Augur Can Find Whatever He Will

ARTHUR F. RICE, of the New York State Coal Merchants' Association, has prophesied that the price of coal (meaning doubtless domestic anthracite) is going to be greatly reduced. At first it would appear as if Mr. Rice believed that the price of coal charged by the producer was too high, in consideration of the costs of production, but later he makes it clear that his charge is that labor in the industry is overpaid, as also in other industries, and that materials purchased by the coal operator cost him too much.

Because of Mr. Rice's explanatory remarks it will not be necessary to take up the question from the point of view of the operator, whom he does not accuse. It will not be needful to repeat or prove what has already been repeated and proved, that 25 per cent. of the anthracite coal is sold for less than the mining cost and 60 per cent. is sold at such a figure as precludes a bond rate of revenue on the money invested. It is only required of us to show that the price of labor and materials is quite unlikely to decline.

The strength of the labor unions is such that they will not allow any reduction in wages. In fact not only the unions but most operators also are opposed to decreases in wage schedules. The general consensus of opinion among men in and out of the industry is against any scaling down in wage. For this reason it will not occur. It would not do the workingman any particular harm if only costs of living came down concurrently, as they ultimately would, but these costs would probably decline quite slowly and there would be an important exception in wheat, the price of which is regulated by law. But such a reduction would unsettle values and undermine confidence to such a degree that distress would be almost sure to intervene.

It is just as well that high-level wages remain stabilized. A few wage scales will be graduated upward till matters are equalized, and then prices will be fixed and business will move along without jarring or uncertainty. It is not likely that there will be any great scaling down of prices. A few things like anthracite will undoubtedy cost more. Bituminous coal will decline little if at all. Building costs will go up a little higher rather than down; wages have hardly reached their final adjustments among some of the trades involved. As for rents, they are sure to go up, though in many industries with low increases the renters will find it hard to pay such advances in rent. But till a further increase occurs building will not be remunerative, and no building program will go forward till immediate and adequate returns are certain.

A clever augur can find what he will, and some of the persons who happened not to be in a unionized trade or happen not to have to deal with unionized labor are not aware of the forces which now sustain the labor market. Mr. Rice's contention would have been incontestable 25 years ago, conceivable even 10 years ago; but it is impossible today. Let us cease advocating and prophesying what cannot happen, and pin our faith on facts, not on visions. Prices of materials will not decline, wages will remain just where they are, though outside the coal, munition, shipbuilding and a few more industries they may even rise. Knowing this there is no reason to delay buying, in fact anthracite should be bought now. It will never be as low in the future as it is at the present time.

Let the mine operator control the byproducts of his industry. Why should he restrict himself to mining and let others take his coal and make a fortune out of it? The operator should make byproduct coke, near coal, byproducts and power. He should not leave it to others to do this work and retain the profits.

Adoption of Larger Mechanical Units

IT IS a well-known principle in power-plant operation that the greatest economy is effected by the largest units. That this theory is generally recognized in the coal industry is well shown by an examination of statistics bearing on the subject. During the seven-year period 1902-1909, the total number of steam engines in the coal fields of the country increased from 11,142 to 19,318, or 73.4 per cent. During this same time the total horsepower increased 107.2 per cent. The average horsepower of all engines in use in 1909 has thus shown an increase of 50 per cent.

More recent figures for the Pennsylvania bituminous fields throw still more light on this subject. In 1910 there were 2880 steam engines in use, or one for each 52,000 tons of coal produced. Up to 1913 the total number of engines remained practically unchanged, but during the three succeeding years the number declined rapidly until in 1916 there were only 2313 steam engines in use in the Pennsylvania bituminous fields. The production of coal showed a consistent and fairly uniform increase over the entire six-year period, so that the tonnage produced per engine in 1916 amounted to 73,000, an increase of 40 per cent.

Progressive mine managers will follow this rapidly increasing development in mechanical efficiency closely. Manufacturers of machinery are devoting more attention to the requirements of the mines. Firms specializing on coal machinery of various descriptions are bringing some of the best brains in the country to bear on the subject, and the next decade will see an even more rapid development in the use of machinery in the coal fields, due to the increasing cost of labor.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

By no means let us fear discussing labor matters. The obvious may for some months, years or decades deceive the discussers, whether operators or mine workers, but time and study eventually lead to the truth, and maxims of the operator, long banned by the mine worker, become accepted and advanced by the latter, while the shibboleths of the mine worker, indignantly denied by the operator, finally meet his acceptance.

Let us, in labor matters, never despair of the coming of the light. It rises with education and discussion as surely as does the sun with cock crowing. A little learning is a dangerous thing; a few days of consideration may make a bolshevist, but several years of study cannot fail to make a conservative democrat. If it did not there would certainly be something wrong with conservative democracy and something to be commended in bolshevism. Truth always in the end justifies itself.

HIGH WAGES AND LOW PRICES CONFLICT

Not in this present preface shall anything be said of that growing progress in economic orientation which has come to the operator almost without his realizing it. That which should be said is rather about the mine worker. He is beginning to see that wages are a function of prices, that prices are cost plus and that an orderly condition is not to be expected in business when that plus is dropped or converted into a minus. Listen to the anthracite mine worker's cry that no attempt shall be made to muckrake the coal industry and depress prices to such a low point as shall make it hard to pay fair wages. The workingman is beginning slowly to learn that the operator is the indispensable middleman who passes on as wages the greater part of what he receives as prices.

Five presidents of the United Mine Workers of America and their secretaries met in Harrisburg, Penn., on Feb. 19 and declared that they would fight the Glass bill in the House of Representatives. This bill provided for the appointment of a commission to investigate the prices of fuel and food and report recommendations for the lowering of those prices.

LABOR REPRESENTATIVE OPPOSES PRICE INQUIRY

The mine workers fear that if fuel prices are lowered wages will go with them. This is what Representative David Fowler, of Lackawanna County, and a national organizer for the mine workers, had to say:

"Our present contract with the operators expires Apr. 20, 1920. Until that time there is no chance of a reduction in the wage scale, but we have to look ahead a little to the time for shaping a new contract. If this commission provided in the Glass bill recommends a decrease in fuel prices and it is placed in effect, there will be considerable difficulty in drawing up a contract that will suit the workers and the operators."

Time was when the mine workers disliked the operators so much that they tried to burn them like the proverbial candle at both ends. They fired them at one end with wages and at the other end they lighted the wick of lower prices, charging that the operator robbed the public by his exorbitant demands. They have learned better. In Illinois the mine workers have repeatedly threatened strikes on the luckless dolt of an operator who would cut prices which have been established as reasonable by the United States Fuel Administration. If these prices were fair during the war, they argue, they are still fair.

The disposition toward the day wage in western Canada recorded elsewhere in this department is quite interesting. It does not arise, however, from a proper consideration of economic principles. It seems to have its supporters in the laggards, the shiftless, the old men and the feeble.

Perhaps something might well be done for the two latter classes, when putting the more efficient day-labor principle into force. It should not be made hard for them to find a place in the scheme of things. However, is it not true that that place is not at the face but rather as watchmen, gatetenders, switchmen and what not? The older men and the feeble drift back, do they not, into the ranks of the day workers? After all, surely the problem presented by the feeble and the old does not throw a sufficient cloud on the validity of the day-work principle.

One cannot, nevertheless, advocate the total abandonment of piecework with its needful stimulus to production. A better plan would be a 50-50 arrangement, in which each man would get about half for his day labor and his presence at the mine for a full day and roughly half for his production in the course of that time. This economic arrangement would work for his good and for the good of the operator and public.

About 1500 Cape Breton mine workers are idle at the Florence and Sydney mines. The Nova Scotia Steel and Coal Co. has closed down No. 3 Florence mine as a protest, it is said, against the alleged interference in their operations on the part of the Dominion Coal Co. Whether the shutting down is a real protest born of resentment or only an action due to the inefficiency resulting from the Governmental decision to compel the Nova Scotia Steel and Coal Co. to surrender some of its lands to the Dominion Coal Co. is not clear. The Amalgamated Mine Workers of Nova Scotia at Glace Bay held a meeting Feb. 22 at which a resolution was passed calling on the provincial government to take what action is necessary to bring about the reëmployment of the men affected.

Alberta Miners Want Day-Wage System

Arguing that the present contract system or pay-by-what-you-achieve is not fair to the miner, the union mine workers of District No. 18 of the United Mine Workers of America in the western part of the Dominion of Canada declared that it produced wages excessively low. Asked what would be considered a fair wage, one delegate said $8 a day. The miners in Alberta are getting a little over one-half as much according to Delegate McRoberts, of Taber.

One of the men admitted at the recent 16th Annual Convention that some men were making good under the piecework contract, but he contended that the wage should be fixed on a per-diem basis. D. McNab, of Lethbridge, declared that some men in his district were working under contract and were making only from $2 to $2.50 a day.

It appeared to be the thought that in slack times the operators hired more men than necessity demanded and the result was that short time, short hours and slow run depleted the earnings of the contract workers and made it impossible to earn a good wage despite the fairness of the scale itself.

When Secretary Ed Browne was asked as to the ability of Alberta to start a system of its own, he replied that he was informed that each district had local autonomy in making contracts, but that the constitution of the union reserved to the international executive board the right of lending moral and financial aid when a strike is called. Ed Browne said he did not know of any district in America where the day-wage system was in operation.

An international organizer, Dave Irvine, stated that he had worked under the day-wage system at the mines of

the Stirling Coal Co. in Pennsylvania. On that occasion the operators took some of their largest mines and had them run to full capacity. They selected only the more efficient men, excluding all over 35 years of age. There was no compensation for working in wet or dangerous places. The feeling grew so strong that the manager was driven out of the district at the point of a gun. He said the day system would disrupt the union and declared that, under that method of payment, there would be ten times as many straw bosses as at present.

In the same convention a debate arose as to the condition of the bunkhouses which several delegates declared were of such character as to be unfitted for the housing of cattle. One man asserted that some had not been washed out for 18 months.

The *United Mine Workers' Journal* was described by one delegate as "more poisonous to the worker than any capitalist newspaper of Wall Street." The old wage scale in District No. 18 expires on Mar. 31, and the convention is for the purpose of determining what kind of contract will replace the old one.

Equal Time for Daymen and Miners

The local unions of the United Mine Workers of America, located within District No. 9, met in mass meeting at Kulpmont, Northumberland County, Pennsylvania, and decided, as stated last week, that they would be better off if only the United States Government could be induced to operate the mines. They want full-time operation and believe that it could be arranged if the Federal authorities had control and ownership. Irregular work gives them only inadequate pay, while food and clothing remain at the same high prices. The mines are working only about three days a week.

Some problems, which have lain low while work was steady and pressing, now come again to the fore. Miners where there are good haulage facilities often work on idle days preparing coal, so that on the next working day there will be no difficulty in producing large individual tonnage. At some mines there are men who earn as much with half-time operation of the mines as if the mines worked every day.

The mine workers meeting at Kulpmont attacked this practice of allowing miners to work every day while the day workers only work, say, three days a week. In Indiana and in some parts of the Middle West no work is done on what are known as "idle days," and miners are fined who fill cars when the mine is officially idle.

In parts of central Pennsylvania drivers themselves prepare coal on idle days. They are sometimes allowed to place a few cars at quitting time or on the idle day. These they themselves load with coal in chambers that would otherwise not be working. These practices are so general that they explain in part why, with steady work, the production last year was not so great as would have been obtained if the same per diem production had been maintained with full operation as was obtained with broken time.

The mine workers also passed a resolution directing miners not to do company work as they had been in the habit of doing during the war. Miners are not asked to do day work unless some day worker is idle. Refusal to do the work does not help the day worker but does cripple the mines and prevents the miner from getting the fullest time that conditions warrant, for a dayman short will delay the work of many miners.

Leaders in the Right on Bolshevism

The first open evidences of bolshevism among the United Mine Workers in West Virginia was exhibited on Friday, Feb. 14, when about 500 or 1000 miners in attendance at a special convention of district No. 17 paraded the principal streets of Charleston, winding up their parade in front of the capitol, from the portico of which a fiery speech was made by "Mother Jones." The demonstration staged was in the nature of a protest against the bill which prohibits anyone from displaying or having in his or her possession a red flag or any other kind of a flag except that of the United States, or of a nation with which the United States is not at war. It was also a protest against the enactment of any kind of law replacing the national guard by a police force in the work of providing for local order.

The miners' convention was called for the sole purpose of protesting against these two bills, and it lasted throughout the week, during which time many bolshevik addresses were made. Several delegations called on Governor Cornwell, insisting that he agree to veto both bills against which the miners were protesting when these bills came to him for approval; but the governor stood his ground, pointing out that he had recommended both measures in his message and that some form of state police protection was necessary.

The climax came, however, when the miners' convention passed a resolution condemning the representatives of organized labor in the House of Delegates for voting for the anti-red flag bill, Mother Jones heaping vitriolic abuse on the labor representatives as well as on the whole legislature in her speech from the front of the capitol. The labor representatives, in a statement inserted in the record of the House, while defending their course pretty plainly insinuated that the miners were on a par with the Industrial Workers of the World and the Bolsheviki. The statement follows:

"Organized labor is not afraid to trust the people. The American Federation of Labor performed a great task of patriotic duty when it set its face hard against I. W. W.-ism, bolshevism and those forces of destruction which believe in 'sabotage' or direct action, and which seek to destroy the confidence of the people in the Government, and would overthrow it if they had the power.

"We rejoice that the Administration at Washington is deporting these advocates of terrorism from the country. These forces are constantly working to misdirect the labor movement. The man or woman who marches under the red flag is in full sympathy with the progress of the terrorists.

"It is our deliberate judgment that we would have made a mistake if we had opposed House Bill 104. We would have placed organized labor in an unhappy light, and, by failing to support the measure, would have reflected on both your loyalty and intelligence."

Illinois Mines Are Working Slowly

Harry Fishwick, vice president of the United Mine Workers in Illinois says that there are 90,000 coal-mine workers in that state working less than half time. About 600 mines are running in a haphazard way. Some of them are operated only three days a week. Some mines are only working one day in seven, and the average time is only 2½ days a week. With our present way of looking at affairs such men cannot be said to be employed.

Coal operators say that owing to conditions in the market there is practically no demand for coal the state over, the amount still remaining in storage precluding any further purchases. The industrial unrest and the uncertainty as to future demand are also factors in the present dullness. However, Fishwick is optimistic over the general outlook.

The discontent is being fanned, not only by the slow running of producing mines, but by reason of the complete closing down during the winter of the mines started to supply the large war-time consumption. New mines were opened, old and abandoned mines were reopened and many of these were too new or too old or too poorly planned and managed to be profitable with declining prices. They are closed down already or will be closing during the course of the present year. With 20,000 more miners nominally at work than before the war started, readjustment of conditions is not without its difficulties.

Tonnage has decreased since the armistice is signed. In October when hostilities ceased (Oct. 11) the Illinois output was 8,286,000 tons, in November 6,286,000, in December around 6,000,000 tons. January and February are expected to show even greater decreases in coal output.

Leave a Little for Other Workers

A few mine workers have been expecting a further wage increase. There are unfortunately only just so many bites in the apple of the World's Production, so let us refrain from even the thought that we have the right to insist on taking two bites. The apple of the World's Production in 1919 is going to be small. Everywhere work has been lacking in steadiness; everywhere there has been ill health. There will be less than usual to divide, so the industry must not look for larger wages, but rest content with those it has. In this way every mine worker will get his share of the World's Production in 1919. Too bad the apple seems likely to be small, but we can look for larger apples when business gets adjusted to the present high wage scale.

DISCUSSION BY READERS

Gravity-Plane Haulage

Letter No. 1—I have read with a great deal of interest the question of using a gravity-plane haulage, presented in the inquiry, *Coal Age*, Jan. 2, p. 32; and, while I agree with the formula that was shown in the reply to this question, I would like to add a few comments designed to show further the impracticability of attempting to operate the proposed incline as a gravity plane for hauling trips of 25 cars, as stated in the inquiry.

Of course, the matter of laying out a gravity plane, so that the loaded cars descending the plane will pull the empties back up the grade, must be analyzed carefully and the number of cars that it is possible to haul in a trip determined by a calculation based on the various data given or involved in the question. It is the only way that such a problem can be successfully solved and its practicability determined.

However, let me suggest viewing the proposition from another angle and consider the case from the viewpoint of the descending load. Since the empty cars are said to weigh 1500 lb. and have a capacity of 2600 lb. of coal, each, the total weight of a trip of 25 loaded cars would be $25(1500 + 2600) = 102{,}500$ lb., or nearly 52 tons. On a grade of 20 per cent., I calculate that the strain on the haulage rope would be about 18 tons, which would require a $1\frac{3}{8}$-in. steel rope.

But, it is necessary to consider, also, the weight of the rope, which would be about 6 lb. per ft. This would increase the load on the rope considerably and would necessitate using a $1\frac{7}{8}$-in. rope, instead of that previously mentioned. Such a rope would cost over $1 per ft., which would make this proposed method of transporting the coal from the tipple to the tracks for shipment expensive. At the same time, the incline would have to be so arranged as to give a proper landing place, both at the top and the bottom of the plane, sufficient to accommodate 25 cars in a straight line.

In my experience, I have never seen an incline operated by gravity on as large a scale as this, and I am very doubtful if it can be done. Instead of the proposed incline, let me suggest the advisability of installing an aerial tramway for lowering this coal from the tipple to the point of shipment. The use of such a tramway would insure a large daily capacity.

St. Louis, Mo. WIRE ROPE.

[We quite agree with the suggestion of an aerial tramway, which this correspondent has offered as a substitute for the proposed gravity incline mentioned in the inquiry to which he has referred. It was shown in our reply to that inquiry that the conditions would only permit the lowering of a trip of five cars at a time; and we stated that it was practically impossible to handle trips of 25 cars of the size given, on such an incline.

However, our correspondent, in his calculation of the size of rope required to hold a descending loaded trip of 25 cars having a total weight of 102,500 lb., is somewhat in error. The gravity pull of this loaded trip, descending a 20 per cent. grade, and assuming a track resistance of 20 lb. per ton, is calculated by the formula

$$S = W\left(\sin a - \frac{\cos a}{100}\right)$$

In this formula S = the load on the rope (lb.); W = the total weight of a loaded trip (lb.); a = the angle of inclination of the incline, or the grade angle. For a 20 per cent. grade, based on horizontal measurement, the grade angle is 11° 19′; and $\sin a = 0.19623$; $\cos a = 0.98056$. Hence substituting these and the given values in this formula, we find, for the load on the rope when a loaded trip of 25 cars is at the top of the incline

$$S = \frac{102{,}500}{2000}\left(0.19623 - \frac{0.98056}{100}\right) = 9.5 \text{ tons.}$$

The size of rope required for this safe working load is a $1\frac{1}{4}$ cast-steel, 6-strand, 7-wire haulage rope, which will carry a safe working load of 9.6 tons and weighs 2.45 lb. per ft. The weight of this rope for a length of 5500 ft. is, therefore, $5500 \times 2.45 = 13{,}475$ lb. The gravity pull due to this rope resting on the rope rollers, on the incline, may be taken as adding $1\frac{1}{4}$ tons when the loaded trip is at or near the foot of the incline, which would make the total load on the rope about $10\frac{3}{4}$ tons, and would require increasing the diameter of the rope to $1\frac{3}{8}$ in., instead of $1\frac{7}{8}$ in., as estimated by the correspondent.—EDITOR.]

Coal, Railroads and the Government

Letter No. 2—Referring to the probable five-year extension of government control of railroads, to which attention is drawn in the Foreword, in *Coal Age*, Jan. 23, allow me to say many seem to think that a decided benefit will result under the guiding hand of the Government. It is quite generally thought that there will be a more equitable distribution of cars and markets, in the different coal-producing districts; and that strikes and lockouts by reason of labor difficulties will be prevented, and less frequent shutdowns occur by reason of lack of car supply. It is even thought that price fixing will make the profits of coal operators more uniform when the Government has full control of the situation.

It is argued that the unlimited ability of the Government to supply what capital is needed for the building of tracks, bridges, culverts, etc., to reach isolated mines, will greatly assist the development of properties lying in such districts. This, of course, particularly applies to mountainous regions, where private capital has been inadequate for such development.

In some cases, where it has happened that the managements of competing mines engaged in the development of adjoining properties, have labored under the unnecessary expense of building two lines to reach their properties, the advantage will be gained that, under a single

administration, a single track only will be required. This condition will prove a benefit under government control.

On the other hand, however, government control of railroads, in its effect on the transportation of coal, may be found to possess some disadvantages. The appointment of a single man clothed with power to direct affairs may be assumed to be not without the danger of prejudice developing in favor of one locality to the detriment of another. It can hardly be expected that the same interest will be shown in different developments as under private ownership and control.

Again, the large army of railroad employees, when working for the Government, may not manifest the same interest as they would show if working for a single corporation, and the efficiency of the system may thus be lessened. Permit me, here, to cite an instance that came to light, in my conversation with a man who had worked, last winter, to clear the tracks of snow, on railroads owned by the Canadian government.

Railroad traffic was completely blockaded between the largest cities in Canada. The force employed to clear the tracks were reported as "working full time," which they were not. In describing the situation, this man said, "What does it matter whether we work or not, when the government is good for our money?" Such may be the results in the States when the railroads are under government control. C. McMANIMAN.

Rawdon, Quebec, Canada.

Ventilating Power Excessive

Letter No. 2—I was both amused and astonished, in reading the statement of P. A. Grady, in *Coal Age*, Jan. 2, p. 27, to the effect that a large operation in his state (West Virginia) found that their ventilating power was costing 7c. per ton of coal mined, which was afterward reduced to 1c. a ton. This was an extraordinary occurrence and raises the question, in one's mind, as to what was the cause. It is my belief that the same conditions exist in almost every mine where the management does not possess a knowledge of the chief principles governing mine ventilation.

Too often it happens that little heed is given to the power consumed in the ventilation of a mine. The aircourses are not examined and cleaned up and the distance that the air must travel shortened as much as possible. Seldom is any attention given to a close examination of the many indirect causes by which the cost of production is greatly increased. But, when word goes out that the cost of operation must be reduced, the attention of the mine officials is commonly given to other matters, while these hidden causes are overlooked entirely.

What is necessary to bring about a more intelligent understanding of the causes that increase the cost of production is the installation of meters that will show the power consumed in the different operations of the mine. There should be a more general use of such meters, water gages, and other instruments to ascertain the exact condition. It is staggering to think that the installation of a single meter, in the case mentioned, brought to light the fact that a saving of 6c., per ton per day, could be effected. In other words, assuming the output of that mine was 1000 tons, it was found possible to save $60 a day, or from $15,000 to $20,000 a year, in ventilation alone.

Does not this fact impress the thought that there is great need of superintendents with technical education? Yet, how true it is that coal operators often regard such men as expensive luxuries that they cannot afford. But, where such men have been employed they have, at times, laid the foundation of future efficiency that some other fellow, less competent than themselves, has received the credit for accomplishing, because the management cut out the higher-price man just when he was about to reap the reward of his labors.

For a time, a great improvement is observed and the new man is credited with what was the other man's dues; but the later falling off of the output shows the management their mistake. I sometimes think that if more superintendents owned a little stock in the mine in their charge, greater efficiency and economy would result. W. H. LUXTON.

Linton, Ind.

Cost of Upkeep of Mine Cars

Letter No. 1—I was interested in reading the inquiry in *Coal Age*, Nov. 14, p. 918, relative to comparative systems of costs in repairing mine cars. The inquirer requested that readers of *Coal Age* having available records of such costs of upkeep of either plain- or roller-bearing cars should be willing to present them for discussion.

It was hoped that the attention thus drawn to this subject would help to show how the costs of repairs can be much reduced. That there has not been more of a response to this request seems to indicate that the matter of systematic repairs of mine cars is one that has not received the attention it deserves. As has been suggested, these repairs are too often made in a "haphazard or makeshift fashion."

CONSIDERATIONS THAT WILL REDUCE COST

While I have no figures to present, permit me to offer a few suggestions regarding the repair of mine cars. The first consideration is to give proper attention to the weakest parts of the car and those that succumb more easily to wear and tear in use. The type of car employed in any particular mine should be adapted to the conditions of the service. In mines where there are heavy grades—and there are many such mines—the cars should be equipped with a suitable brake, if it is desired to minimize the cost of repairs. The absence of good brakes on mine cars is the cause of more runaways and wrecks, resulting in bent axles, broken cars and other injuries that require the car being sent to the shop for repairs.

It will, of course, frequently happen that the poor judgment of a miner, or his negligence in not seeing that the car set in his place is out of danger when a blast is fired, will result in the end of the car being stove in by the blast. At other times, a car may be flattened out or otherwise injured by a heavy fall of rock in a place. Such accidents, however, are less frequently the cause of repairs being needed, than the neglect to equip the cars with good brakes. At least, that is my experience.

Another item that is the cause of the need of frequent repairs is the wear of wheels and boxes or bearings. Of course, this wear will take place sooner or later; but wheels and bearings will last much longer if they are properly lubricated or oiled. Also, the cars will need to be sent to the shop less often if worn wheels are not used and the bearings are kept in good condition. The car will run much more smoothly and be subject to less wear and tear when that is the case.

PROMPT REPAIRS AND CLOSE INSPECTION NEEDED

Attention must also be given to other parts that are subject to the severe strain of service, such as drawbars, couplings and bumpers. It would seem unnecessary to mention, in this connection, that the roadbed and track should be maintained in good condition, if the cost of car repairs is to be kept low.

In closing, let me say that every car should be carefully inspected on the tipple, before it is sent back into the mine. It will often be found that a bolt is needed, or some similar slight repair is wanted and which can be made on the tipple without sending the car to the shop. Prompt attention to these seemingly simple requirements will go far toward avoiding more costly repairs in the future.

Of course, for the more serious repairs, it will pay better to shop the car, which should always be done before the latter is sent back into the mine, to be further weakened and cause a possible wreck. Car repairmen, foremen, and tipplemen should coöperate in the careful inspection of all cars, and no requirements, however simple, should be neglected, but should be attended to at once. CAR REPAIRMAN.

Thomas, W. Va.

Iron vs. Wood Mine Cars

Letter No. 8—Referring to the discussion of the question of the relative merits of iron and wood mine cars, permit me to say that my own personal experience makes me prefer the wood car, which I believe is much better, considered from the standpoint of repairs. Few mines are equipped with appliances for making repairs on steel cars that have been damaged in the mine. On the other hand, nearly every mine in the country is equipped for making the necessary repairs to wood cars.

The composite car, part wood and part iron, while possessing much of the advantage in regard to lightness and being less rigid than the steel car, still presents much of the difficulty of the latter type, in respect to the repairs needed after the car has been in a wreck. Wherever it is possible to provide some simple and practical method for repairing the composite car, it is my opinion that this would be the most satisfactory type to employ in coal-mining practice. This is particularly true in mines where there is less danger of the cars being rusted and corroded by the acid mine water.

Where conditions are so variable as in coal mining, there is always bound to be much difference of opinion in respect to the merits and demerits of two types of equipment, such as are here presented. From the letters thus far submitted, however, nearly everyone has advocated the use of the wood car, and it would be interesting to hear from a strong advocate of either the steel or the composite car, and to observe what arguments he would present to support his view.

In his letter, *Coal Age*, Jan. 16, p. 157, "Progressive" asked for the type of wheel that has the longest life. In this regard, let me submit my conclusions, drawn from experience with different types of wheels, of which there are a large number on the market that merit consideration in respect to their material, chill and strength. I have tried practically all of these types.

In my estimation, the wheel that will give the best mine service is a good flexible, roller-bearing wheel that is so designed that the bearing will have a definite inclosure in which to work. I mean by this that the design of the wheel should be such that the bearing will at all times be free from end thrust and end wear, which will have a tendency to keep the lubricant well distributed in the bearing.

PRACTICAL DESIGN OF ROLLER-BEARING WHEELS

The design of the wheel should also be such that it will be easy to get off without requiring the services of three men and a boy for that work. Some wheels require the knowledge of a man who can open a safe without knowing the combination, before he can get the wheel off the car. The resulting loss of time would eliminate such a wheel from mine use.

Another feature that appeals to me, in the construction of a mine-car wheel, is a cage for the rollers to work in. It has always been my experience that when the rollers are put in loose, they fall out in the dirt, the moment the wheel is taken off. It is then a pretty hard matter for a man to get them all back where they came from, to say nothing of the work of cleaning off the dirt and grit that adheres to the rollers.

Several of the manufacturers of this type of equipment make wheels that, with proper care, will last from seven to ten years, in mine service. Let me say that my idea of a good wheel is one that will give satisfactory service for this length of time and be easy to take off and put on, while at the same time being economical in respect to lubrication.

———, Ill. RICHARD W. HARRIS.

Letter No. 9—Regarding the relative utility of these two types of cars, in coal-mining practice, permit me to submit the following suggestions as the result of my own observations and experience.

Before a final selection of any mining equipment is made, careful consideration should be given to the many aspects that bear on the economical and successful working of the apparatus in question. In respect to mine cars, the shape, dimensions and capacity of the cars must be carefully determined, in conformity with the desired output of the mine and the conditions relating to length of haul and style of equipment. The kind of material entering the car must be selected with respect to the service required in the mine and the means at hand for repairing the cars when damaged.

In bituminous mining practice, in my estimation, a cheap and at the same time serviceable car is one made entirely of wood. The bottom planks are 3 in. thick, side planks, 1½ in. thick and the doors and back ends, 2 in. thick. The floor and side planks are bolted to properly bent car irons, which serve as stays to keep the car body from spreading.

Wood cars of this type are easily repaired and require no skilled labor for that purpose. The work is all done in an ordinarily equipped mine-car shop. The necessary iron stays, wheels and axles are readily obtained from manufacturers dealing in such material. The particular advantage gained in the use of wood cars is the ease with which repairs can be made when a wreck occurs in the mine. It will then require but a few days to put the cars in shape for use again. This is not the case where iron or steel cars are in use.

When a wreck occurs in a mine using iron cars it will often take a day or two to clear the track so that haulage can be resumed on that entry. Moreover, after the wreck is cleared, special equipment is required to straighten the bent cars and make them again ready for service. Another disadvantage in the use of iron cars is the corrosion that takes place by reason of the iron being exposed to the moist air and acid water of a coal mine.

The Composite Car in Anthracite Mines

In anthracite-mining practice, a part wood and part iron car is often used with economy and satisfaction where the cars are hauled in long trips over great distances daily. The bed frame of this type of car should be made of oak lumber. The end-sills and cross-sills must be tenoned or mortised into the side-sills and the entire frame held together with the tie bars. The side-sills are made to project at each end of the car so as to form bumpers. These are supported by an auxiliary block bolted to the frame and further protected with sheet iron to prevent the ends of the timber being split.

The bottoms and sides of this car are formed of heavy sheet iron to provide for the great wear due to the sharp hard coal, which is often loaded from a chute from 1 to 3 ft. above the car. This style of car being in parts is cheaply and easily repaired when damaged.

Sugarloaf, Penn. JOSEPH LAWRENCE.

Drawing Pillars in Machine Mining

Letter No. 7—My attention having been called, only recently, to the inquiry that appeared in *Coal Age*, Jan. 2, p. 32, regarding the drawing back of pillars by machines, allow me to give a brief outline of the method that has worked out very favorably in our mine, where the pillars are drawn back with electric chain machines, in a seam of coal varying from 5 to 8 ft. in thickness. The plan is as follows:

Assuming that the nature of the top and bottom presents conditions that are favorable to the use of machines, and that the rooms are driven on, say 50-ft. centers, giving a good width of pillar sufficient for the support of the roof when retreating, the first step is to drive a crosscut through the pillar, at the face of a room that has reached the limit.

Having cut through the pillar at the face, the machine is moved back and a new cut started in the pillar, leaving a stump of not less than 8 ft. in thickness, between this cut and the last one. This is done for the protection of the machine and the men while making the cut.

When this second cut has been carried through the pillar, the machine is brought around and the protecting stump is cut out, except two small stumps, one at each end, which are left for the protection of the cutter and must be taken out later with picks.

The same process is followed continuously, by making successive cuts through the pillar and removing the stump as each cut is finished, in the manner I have described, until the entire pillar is removed back to the entry stump. When this plan is given a fair trial, I believe it will prove successful under favorable conditions for machine work. MINE FOREMAN.

Homer City, Penn.

Letter No. 8—I regret that the inquirer, in this case, has not stated the thickness of the pillars, the hardness of the coal, or the nature of the bottom, all of which have an important bearing on the question of drawing back the pillars. One may assume, however, a two-thirds extraction of the coal, which is a common rule in practice; and this would indicate that the rooms were driven on about 40-ft. centers, which would make the room pillars 13 ft. thick.

Now, taking the average weight of material forming the overburden as 160 lb. per cu.ft., the roof pressure due to 200 ft. of cover is $200 \times 160 = 32{,}000$ lb. per sq.ft. This would mean that the pressure on a 13-ft. pillar, with rooms driven 27 ft. wide, would be $32{,}000 \times 40 \div 13 = 98{,}460$ lb., or nearly 50 tons per sq.ft.

Whether the pillars will be able to withstand this pressure will depend chiefly on the crushing strength of the coal, which varies widely with different coals and in different localities. In order to reduce this pressure, there must be a greater width of pillar as compared with the width of the rooms. Also, it will be difficult to draw back the pillar with machines where the bottom is soft, as the heaving of the bottom under the increasing pressure of the pillars would make it impossible to use the machines.

Assuming, however, that the conditions are such as to permit the use of machines, my plan would be to cut through each pillar 10 ft. wide, leaving 10 ft. of solid coal to be mined out with the pick. This work must be done regularly in order to give a good line of fracture. No. 1 pillar should be drawn by cutting through from No. 2 room. The first cut in No. 2 pillar should be made as soon as the second cut in No. 1 is completed.

The roof must be well timbered before starting any cuts in the pillars. When the stump 10 ft. in width has been removed with picks and the timbers drawn, if the roof fails to break, a fall should be started by placing one or more shots in the roof, a short distance back in the gob. It is important to do this in order to prevent the roof from breaking off at the pillar, which it may do later unless a fall is started in the manner I have mentioned. C. MCMANIMAN.

Rawdon, Quebec, Canada.

Efficiency in Firebossing

Letter No. 7—A few years ago, I was talking with a foreman who had given up his position, owing to a nervous breakdown caused by overwork. On recovering, he was content to accept a position as assistant foreman. In speaking of this backward step, he said, "Never will I again take a position as foreman where there are a lot

of firebosses who take no interest in any work other than their own. In my last place, I had no help; the firebosses were of no assistance to me and I was forced to keep plugging away, until I broke down under the strain. If I were to assume the responsibilities of foreman again, I would be very particular whom I selected as my lieutenants."

Helpfulness of Firebosses Who Coöperate

Many a foreman has had a similar experience and has succumbed to the arduous duties of his position, because of the lack of helpfulness and coöperation, on the part of the firebosses. Many firebosses are content to think that they have done their whole duty when their morning examination is finished, believing that nothing else is expected of them. But, give me the man who makes his rounds with his eyes open and is willing to cooperate with his foreman in every particular that will assist in making the day's run a success.

Such a fireboss can tell from his observation what coal is loaded and where empties are needed; what places should be timbered or roads cleared of falls and give other information that will assist the foreman in starting work in the mine where it is most needed. Such a one is constantly looking ahead and lending every assistance to keep the wheels turning in the mine.

Many a person who holds a certificate of qualification to act as fireboss has found, on assuming the duties of that position, that he must possess something more than his certificate, in order to successfully carry on the work required of him. The manner in which he performs his duties determines his efficiency as a fireboss. Much will depend on his training. The most successful fireboss is, often, a man who has had several years' experience as a bratticeman, which has taught him the most efficient means of handling gas accumulated in the workings, and what precautions it is necessary to take to insure the safety of the men employed in the mine.

During the last 20 years, I have watched men taken from other occupations, to assume the duties and responsibilities of firebossing, for which their previous training has ill-adapted them. In answer to some of the simplest questions relating to the work they were about to undertake, their words and manner betrayed their ignorance. In regard to some of the conditions they were liable to encounter, they showed that they had not even given the matter a thought.

Intelligent Firebossing Requires Constant Study

The position of fireboss is one in which a man is exposed to danger at all times. He must perform his work conscientiously and fearlessly, both for the welfare of the men in his charge and his employers. The intelligent fireboss will thoroughly familiarize himself with all the features of the safety lamp he uses to make his examination of the mine. He will study the mine map to acquaint himself fully with the requirements in respect to the ventilation of the present workings and the future development of the mine. He must know the requirements of the law and study to make the work conform to its provisions in every respect.

The fireboss who is alert to his opportunities at all times will devote his spare moments to the careful study of questions concerning the work in his charge. He will study these questions both from a practical and a theoretical standpoint. The district to which he has been assigned may be a gassy one, requiring the most careful attention in respect to ventilation and development. The results will show whether or not the man is qualified for the work and the manner of his performance will quickly show his ability to make a good lieutenant, who will coöperate with his foreman.

Another feature, in good firebossing, is a man's ability to handle his men successfully. He must make them understand that he is interested in their welfare. On finding a dangerous condition in a man's place, he must not pounce on the fellow as a catamount would pounce on its prey; but he must take the fellow aside, point out the danger and get him to realize what it means and what he must do to avoid it.

By civil treatment of men as human beings, a fireboss can do more to gain their confidence and have them respect his authority than by any other means. He will thus be able to secure their hearty coöperation and cause them to feel that a place is really dangerous "if the fireboss says so." All this can be accomplished with tact and good judgment, without catering to one and another; and by settling little troubles that arise, without sending for the foreman, which will cause the latter to sit up and take notice that he has a lieutenant that understands his business.

Firebosses the Foreman's Lieutenants

Let me say that any mine foreman who thinks he can run a mine properly without the aid of his lieutenants has an exalted opinion of himself. No wise foreman will bemean his fireboss by sending him to perform work described in the letter of F. G. J., *Coal Age*, Dec. 19, p. 1133, as "carrying bricks." To underestimate the capabilities of a good fireboss shows lack of gumption on the part of the foreman. This would seem to be the case in the citation given in the letter to which I have just referred.

In closing, I will say that a good fireboss is a man who has the initiative to act promptly when an occasion may require. It is that characteristic that will be of great assistance to the foreman. For instance: The morning round being made and the mine reported "O. K.," the men start work loading and blasting coal. A little later, an unfortunate shot has ignited a feeder, and the flame has crept back under the loose coal.

Let us say the miner becomes excited, as the foreman is in a distant part of the mine and can lend no help. But, the alert fireboss is quickly on the scene, and, summoning help, has the loose coal removed and the flame extinguished, thus proving himself a good lieutenant and averting a danger that would have proved serious but for his timely and efficient work.

Again, in the absence of the foreman, in that particular part of the mine, a heavy fall blocks the main road in a certain section. The capable fireboss, once more, shows his efficiency by taking charge and setting men to work to remove the fall and clear the track. Numerous other instances could be cited to show the efficiency of the man with initiative. Suffice it to say that the foreman who is surrounded with such firebosses can go home at night with his mind at ease. He will seldom be the subject of a nervous breakdown because of the strain of continuous overwork.

Kingston, Penn. Lewis R. Thomas.

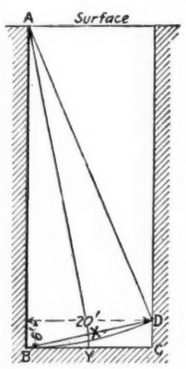
INQUIRIES OF GENERAL INTEREST

Calculating Depth of Shaft

A few days ago my foreman gave me a problem to calculate. As it has been a number of years since I studied trigonometry, I want to ask for the simplest method of solution. He stated that a plumb bob, hung from the top of a shaft that was 20 ft. wide, just reached the bottom, at one side; but when the bob was pulled to the opposite side of the shaft it raised 6 ft. off the bottom. I was asked to calculate the depth of the shaft, from this data. My method by trigonometry, gives this depth as 36 ft. 4 in. Is that correct, and is there a simpler method? STUDENT.

Carlinville, Ill.

It is not necessary to employ trigonometry in this case. The simplest solution is by means of two similar triangles. For example, referring to the accompanying figure, $AB = x$, the depth of the shaft; $BC = 20$ ft., its width; and $CD = 6$ ft., the height the bob rises from the floor when it is pulled to the opposite side of the shaft. Now, the triangle ABD being isosceles, AX, drawn perpendicular to BD bisects the latter and XY is one-half CD, or 3 ft.; and BY is one-half BC, or 10 ft. Then $BX = \sqrt{3^2 + 10^2} = \sqrt{109} = 10.44$ ft.



SECTION THROUGH SHAFT

But, the two right triangles ABX and BXY are similar, having their respective angles equal. Hence:

$$AB : BX :: BX : XY; \quad \text{or } AB = \frac{BX^2}{XY}$$

Then, substituting the given values in this formula, we find for the depth of the shaft,

$$x = \frac{10.44^2}{3} = \frac{109}{3} = 36\tfrac{1}{3}\ ft.$$

The depth of the shaft is therefore 36 ft. 4 in.

Payment for Yardage and Deadwork

I am interested in learning what is the usual practice of coal operators in the payment of their miners for yardage and various kinds of deadwork common to the mining of coal.

At present, I have in mind a coal seam averaging 3½ or 4 ft. in thickness and overlaid with from 4 to 10 in. of slate, above which is 6 or 8 in. of coal. The slate binder and the thin coal above it both come down easily without much shooting and are thrown back into the gob. At times, the rock overlying the wild coal comes down also and must then be handled and stowed in the waste.

Any information that *Coal Age* or its readers can give me, on the general subject of what should be paid for yardage and by what method these prices are determined, will be greatly appreciated. G. STERN.

Frostburg, Md.

The prices paid for yardage and deadwork, in coal mining, are necessarily quite variable, owing to the wide difference in conditions in mines. In any case, the price paid should be based on an agreed valuation of labor and a fair estimation of what would constitute a day's work. It is not to be expected that these matters can be settled and a satisfactory conclusion reached without much prolonged discussion, as the opinions of both employer and employee are more or less biased in favor of their own interests.

In many coal-mining districts, operators have entered into an agreement with their men and the prices to be paid for different classes of work have been adjusted to conform to the known conditions in the mine. In most cases, such an agreement or contract specifies in considerable detail the nature and extent of the work, which is to be performed at a fixed rate or scale of wages and for a specified period. This is the usual case in a union mine; but even where such agreements exist there are many instances of disagreement when the matter in dispute must be arbitrated.

Perhaps, there is no greater difficulty that arises between an employer and his employees than that of fixing a satisfactory price for piecework and yardage. Formerly, all work of that description was commonly done on company time, the miner being paid according to the regular wage scale. But, that did not satisfy him always, as he claimed he could make more money digging coal than by taking down top, lifting bottom or cleaning up roof falls.

Much will depend on the tact and diplomacy of the mine foreman in adjusting a miner's claim for extra time. Such claims are frequently made when a man's place meets a boulder or develops a small roll that thins out the coal. Frequently, a foreman will allow the miner working such a place a keg of powder to compensate him for his extra labor and loss of coal, although every practical miner knows that these troubles are common occurrences in the mining of coal; in other words, they are a part of the game.

By way of summing up this reply, let it be said that, in all cases, the determination of the price that should be paid for labor must be based on an average worker's earning power when performing the task in question. In estimating yardage when driving a 10-ft. heading in a 4-ft. seam, where miners load, an average of 10 tons, at 90c. a ton, thereby earning $10 \times 0.90 =$ $9.00 a day, assuming the heading is driven 1½ yd., the entryman loads, say 7 tons of coal for which he is paid $7 \times 0.90 =$ $6.30, and to equalize his earning power he should receive, as yardage, for handling the refuse over the coal, $(9.00 - 6.30) \div 1\frac{1}{2} =$ $1.80 a yard.

EXAMINATION QUESTIONS

Alabama First-Class Examination, Birmingham, Jan. 20-23, 1919

(*Selected Questions*)

Ques.—A large percentage of mine accidents are caused by miners persisting in loading coal where the roof is unsafe. What rule would you adopt to prevent this condition and reduce the number of accidents?

Ans.—The rule should be adopted making it the duty of every miner to examine carefully the condition of his working place when he first enters the same and before doing anything else. He must observe any marks or danger signs that may have been placed by the fireboss when making his morning examination. If any posts have been knocked out by a blast or a loose piece of top or loose coal is found, it must be made the duty of the miner to reset such posts and stand any other timber that may be required to secure the roof or coal. If loose top or coal is to be taken down, it must be done at once before the miner proceeds to load his coal or do other work.

However, the average coal miner is prone to disregard any rules made for his safety and it becomes necessary, in order to prevent accidents from falls of roof and coal in the working places, to require the frequent and close inspection of all places, by a competent safety inspector or fireboss, while the men are at work. If the fireboss finds a working place unsafe for work when making his morning examination it is his duty not only to place the customary danger signals at all entrances to the place, but also to take the man's check from the board, which will notify the man that he is not to proceed to his work till his place is made safe. All such checks are given at once to the mine foreman, whose duty it is to see that the places of those miners are put in condition for work. No miner must be allowed to proceed into the mine without his check.

Ques.—What method of ventilation lessens the danger of an explosion and, at the same time, reduces friction in a mine?

Ans.—Splitting the air current one or more times so as to ventilate each section of the mine with a separate air split reduces the danger of an explosion occurring in the workings, by conducting the gases generated in each section directly into the main return airway.

This system will make it possible to divide the air between the different sections of a mine according to the need and each section is supplied with a fresh current of pure air traveling at a normal velocity. The frictional resistance of the mine is much reduced and a larger quantity of air is circulated with less power than where a mine is ventilated by a single air current. Also, should gas or dust be ignited in one section, there is less danger of the explosion being propagated throughout the mine.

Ques.—Accidents from blasts and explosions of powder are on the increase. What should be done to reduce them? Answer fully.

Ans.—Where miners are permitted to do their own blasting, strict rules should be made and enforced in regard to the amount of powder permitted to be taken into the mine each day by each man, which amount should be determined by the number of shots the man is to fire that day. This would regulate the charge of powder that is safe to be used. No miner should be permitted to fire a shot or to charge a hole, until the same has been examined by a competent person and found to be safe. Every shot must be fully tamped to the mouth of the hole, with clay and dust taken from the road, or with other incombustible material. No coal slack must be used in tamping a hole. If the mine generates gas no shot must be fired until the place has been examined for gas by the fireboss and pronounced safe for work to proceed.

The safest method to adopt in regard to blasting is to employ competent shotfirers whose duty it is to examine, charge and fire all holes drilled by the miners. The work should be done after the men have left the mine, and plenty of time should be given for its proper performance. No shotfirer should be given charge of a section so large that he is obliged to hurry the work in order to complete his task in the specified time. The work of firing shots must be started on the last of the air and proceed in regular order against the air current. Suitable penalties should be enforced for any violation of the rules and regulations regarding blasting in mines.

Ques.—If the ventilation of a mine is insufficient how may it be increased without increasing the power?

Ans.—In order to increase the circulation in a mine or airway without increasing the power on the air, it is necessary to clean up the airway and remove all obstructions to the passage of the air current. All breakthroughs in rooms and entries must be enlarged to the full section of the airway and kept free of any obstructions, such as the presence of tool boxes, which are too often set in a crosscut to be out of the way of moving cars and where they will not be hit by flying coal or injured by falling roof.

Wherever possible, the distance that the air must travel must be shortened. Where the air can be split without reducing the velocity below what is required to properly ventilate the working places, this should be done to reduce the resistance and provide better ventilation with the same power.

Ques.—How many cubic feet of air will pass per minute along an airway 6 ft. high and 10 ft. wide, the velocity being 450 ft. per min.?

Ans.—The sectional area of this airway is 6 x 10 = 60 sq.ft.; and, assuming the average velocity of the air current as 450 ft. per min., the quantity of air passing is $450 \times 60 = 27{,}000$ cu.ft. per min.

FOREIGN MARKETS AND EXPORT NEWS

The Coal Situation in France

The whole of the French industrial situation hinges on the question of coal. For four years it constituted one of the most vital issues of the war, and now, in the face of an important era of reconstruction, it is destined to play a dominant part in the changing economy of the nation.

The position of France as regards the extent of coal deposits is shown in the following estimates of the International Geological Congress held at Toronto in 1913:

	Tons
United States	3,800,000,000,000
Germany	423,000,000,000
England (including 13,000,000,000 tons of lignite)	190,000,000,000
France	18,000,000,000
Belgium	11,000,000,000

In 1913 the production of coal of the leading countries was as follows:

	Tons
United States	562,595,000
England	292,202,000
Germany	278,627,000
Austria	43,800,000
France	40,844,000
Belgium	22,858,000

Although France ranks high among the great nations in the abundance of its deposits and in the quantity of coal produced per annum, its position is far less favorable when the proportional extent of domestic needs is considered. For instance, in order for the annual production to bear the same relation to the population as that which exists in Belgium, France would have to increase its annual output from 40,000,000 tons to about 200,000,000 tons.

The exploitable coal resources of France contained in deposits lying at a depth of not more than 1200 meters (3937 ft.) are estimated as follows:

	Tons
North (Pas-de-Calais)	9,500,000,000
St. Etienne	685,000,000
Alais	958,000,000
Fuveau (lignites)	1,300,000,000
Center	700,000,000
Total	13,143,000,000

By going to a depth of 1800 meters (5905 ft.) this total may be increased to 71,600,000,000 tons. As the aspiration of France is apparently to increase its production to 100,000,000 tons per annum, it will be seen that the above resources would at that rate be totally exhausted in about 150 years.

The situation in 1913, the last complete calendar year before the war, was as follows:

The French exports in 1913 were: Coal, 1,114,000 tons; coke, 205,000 tons; and briquets, 124,000 tons; making a total of 1,443,000 tons. Calculating the value of coke and briquets in terms of coal, the total exports for 1913 reached a figure of 1,500,482 tons, which may be generally accounted for by local reasons.

The imports of coal, coke, and briquets in 1913 and the amounts from each country were:

From	Coal, Tons	Coke, Tons	Briquets, Tons
England	11,257,000	10,000	175,000
Germany	3,491,000	2,393,000	188,000
Belgium	3,670,000	547,000	642,000
Other countries	293,000	120,000	81,000
Total	18,711,000	3,070,000	1,086,000

The consumption in 1913 according to industries was as follows:

	Tons
Metallurgical industries	12,545,000
Domestic heating	11,979,000
Railways	9,069,000
Mining	5,054,000
Gas factories	4,656,000
Merchant marine	1,720,000
Various industries	19,811,000
Total	64,834,000

It will thus be seen that the annual deficit was so considerable as to make the country dependent upon foreign markets for 37 per cent. of its supply. According to customs statistics the cost of these imports amounted to $111,168,000.

But the mere fact of being compelled to import in such large quantities is not of itself the most serious element involved. Such imports are attracted by a scale of prices which places France at a considerable disadvantage compared with the other competing countries of western Europe.

The average value per ton of French coal at the mouth of the mine for the three years preceding the war was as follows: 1911, $2.94; 1912, $2.99; 1913, $3.20.

As compared with the values current in the neighboring countries for 1912, the following differences are noted: England, $2.17; Germany, $2.54; France, $2.99; Belgium, $3.19.

Assuming that this relative proportion governs and is maintained in the selling price, it may be observed that the industries of France purchased their coal at the mine at prices 38 per cent. higher than those in England and 18 per cent. higher than those in Germany.

From the foregoing figures it might appear that France is more advantageously situated than Belgium as regards the price of coal, owing to certain difficulties of extraction in the latter country. This, however, is not the case, for whereas the foregoing values, except for a slight discrepancy, represent the average prices at which industries in England, Germany and Belgium actually purchased the coal which they consumed, the price in France is governed by the scale of its extensive imports and not by the relative value of domestic coal at the mine.

There is an import duty of $0.23 per ton on foreign coal. In 1912 the average price of foreign coal at the port of arrival after the payment of customs duty was $4.97. As this price applied to approximately one-third of the total amount of coal consumed, the average price of the aggregate was thereby raised to $3.67, which is in reality the figure to be employed in the foregoing comparisons.

Calculated on this basis it will therefore be seen that in 1912 the average price of coal as compared with the price in other countries was in reality much higher than it might appear to be.

Effect of the War on Production

Such, in brief, was the coal situation in France before the war. The German invasion in 1914 immediately cut off 24 per cent. of the mines of France by placing the rich regions of the Nord and of the Pas-de-Calais either in the occupied territory or in the army zone reserved for military operations. This deprived France of more than 50 per cent. of its coal production, the annual output of the invaded Departments of Nord and Pas-de-Calais amounting to 27,389,307 tons according to the statistics for 1913.

In addition to this, France suddenly found itself cut off from two of its principal outside sources of fuel supply (Belgium, 5,000,000 tons, and Germany, 7,000,000 tons), and rendered almost wholly dependent upon the aid of England for the fuel essential to the continuance of its industrial activities. The mines remaining in French possession had a productive capacity in normal times of some 19,000,000 tons, or about 1,600,000 tons per month. The possible length of the war being discounted and the tremendous extent to which its demand would tax the industrial resources not being realized, miners were mobilized with the army. The result was general disorganization and a decrease in production of the few remaining French mines of 60 per cent.

No sooner was this error recognized than steps were taken to withdraw the miners from the front. Refugee miners from the invaded regions were enrolled, and by March, 1915, the normal production of all mines remaining in French possession was virtually restored. The labor necessary to accomplish the effort made by France in the pressing matter of coal production during the war was secured through the demobilization of 50,000 French miners and the utilization of 14,000 enemy prisoners of war. The following scale of production shows the practical results obtained from this effort: January, 1915, 1,532,000 tons; January, 1916, 1,676,000 tons; December, 1916, 1,861,000 tons; October, 1917, 2,783,000 tons.

Comparative Output for 1913-1918

A more elaborate comparison gives a much clearer conception of these results, so gratifying and so promising to the French people, and affords a better understanding of the deplorable situation during the first six months of the war:

Mines	1913 Tons	1914 First Six Months Tons	1914 Second Six Months Tons	1915 Tons	1916 Tons	1917 Tons	First Ten Months of 1918 Tons
Mines of Nord and Pas-de-Calais (invaded)	27,389,307	9,226,227	.....	.....	.....	.....	.....
Mines of Nord and Pas-de-Calais (not invaded)		1,331,241	1,981,399	7,382,292	8,195,025	11,450,463	6,587,250
Other mines	13,454,911	5,567,646	5,461,745	12,150,571	13,115,040	17,441,240	15,730,570
Total production	40,844,218	19,125,114	7,443,144	19,532,863	21,310,065	28,891,703	22,317,820

Coal Shortage Relieved by Imports

Imports on which the nation so widely depended were pushed with equal vigor, Belgium and Germany having been lost as sources of supply. The following table illustrates the manner in which the problem of the importation was met:

Year	From England Tons	From Belgium Tons	From Germany Tons	From United States Tons	From Other Countries Tons	Total Tons
1913	11,257,431	3,659,669	3,482,287	.....	293,736	18,693,123
1914	10,759,058	2,032,099	2,477,735	.....	161,366	15,430,258
1915	18,918,203	45	737	145,398	3,355	19,067,738
1916	18,711,125	14	.....	53,883	9,701	18,774,723
1917	15,848,734	16	247	57,136	2,135	15,908,268

For some time Parliament has been reluctant about granting new coal-mining concessions, and for the past 10 years has granted none at all. This has discouraged coal prospecting and prevented the possible opening up of new mines in regions where workable deposits had been found to exist. The attitude of Parliament is inspired by objections to the mining law of 1810 which provides for the granting of concessions in perpetuity without any participation on the part of the government in the profits of the mines. A bill is now being debated which purports to amend these features of the statute by limiting concessions to 99 years and by providing for government participation in the profits.

According to the gist of the debates it is believed that such a bill would greatly encourage mine development and would afford an effective means of encouraging artificially the working of small mines as well as of those where extraction is difficult.

In addition to the above measures the utilization of inferior, or secondary, fuels is being strongly urged. France is rich in peat, and lignite exists in appreciable quantities. It is estimated that with proper encouragement these resources could be made to contribute largely to the saving of coal.

Netherlands Short of Coal

The nonarrival of British and German coal during the month of December, 1918, writes Commercial Attaché Paul L. Edwards, The Hague, under date of Jan. 5, 1919, has reduced the stock of coal in the Netherlands to such a low point that drastic measures are to be instituted to reduce the consumption of coal during the month of January, 1919. It is hoped that before February coal will arrive from the United States and from England, says Mr. Edwards, and that permanent arrangements will be made for Belgian or German coal. If not, the train service will be considerably reduced on Feb. 1.

The city of Amsterdam put into force on Jan. 6 the following regulations, with a view to saving electricity: Cafés, restaurants, shops and stores were to use only half as much electricity as they had been allowed since Oct. 30 last. Private residences were to reduce the use of electricity to 65 per cent. of the amount used in November, 1918. All factories, etc., were to reduce their consumption of electricity to 65 per cent.; furthermore, they were not to use any electrity whatever for industrial purposes between 4 p.m. and 10 p.m. This restriction in hours did not apply to factories engaged in the preparation or manufacture of foodstuffs; such factories could recommence the use of electricity at 6 p.m., and the amount of electricity which they could use would be determined by the State Coal Bureau.

The "Maasbode" of Jan. 4 stated that the Netherlands Minister of Foreign Affairs was to send a representative to Brussels on Jan. 6 to endeavor to conclude the arrangement for the exchange of Belgian coal for Dutch milch cows. It is understood that Holland is also to offer about 10,000 work and army horses for an additional amount of coal.

During the week ending Jan. 5, 1919, 7000 tons of coal arrived from Germany, but this was to be used expressly to replace a similar amount of coal that was borrowed for the purpose of bunkering vessels that are taking Russian prisoners to Danzig. It is understood, however, that negotiations are being carried on with the Germans to secure the monthly import of 40,000 tons from the Ruhr district. The Algemeen "Handelsblad" of Jan. 4 stated that the first train to bring coal under this proposed arrangement would arrive on Jan. 7, and that thereafter there would be two coal trains regularly each day, providing unexpected transportation difficulties did not interfere.

Sweden offers American exporters of coal a market for steam coal. Those interested should communicate with Consul Wallace J. Young, Goteborg, Sweden.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Feb. 17	Amer. S.S. Lake Agomak	Barbados, B. W. I.	2,920	517
Feb. 17	Dan. Bk. Ternen	Rio de Janeiro, Brazil	1,545	...
Feb. 17	Jap. S.S. Tsurugisan Maru	San Francisco, Cal.	4,770	395
Feb. 17	Nor. Bk. Dagny	Rio de Janeiro, Brazil	1,748	...
Feb. 19	Nor. Bk. Olive Bank	Rio de Janeiro, Brazil	3,374	...
Feb. 21	Am. Sc. Harry G. Deering	Rio de Janeiro, Brazil	2,120	...
Sewalls Point				
Feb. 15	Br. S.S. J. A. McKee	Papudo, Chile	1,776	395
		Los Vilos, Chile	1,000	...
Feb. 18	Amer. S.S. Saguche	Mejillones, Chile	6,728	...
Newport News				
Feb. 14	Nor. S.S. Sangstad	Rio de Janeiro, Brazil	2,956	945
Feb. 18	Amer. S.S. Lake Fondulac	Antilla, Cuba	3,131	356
Feb. 20	Nor. Bk. Skansen I	Rio de Janeiro, Brazil	3,185	...

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Feb. 24 states that the demand for steamers to carry coal to South American ports is still very urgent, and there are few free boats available. South American shippers will now also entertain sailing vessels at the Chartering Committee's maximum rates, if tonnage is not too far distant. West Indian coal freights are also showing renewed activity after a long period of dullness. All recent fixtures have been at the Chartering Committee's maximum rates, which are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net, Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net; with 1000 tons dis. to Rio, $19.50 net, 1000 tons dis., or $21,600 tons dis. to Santos, $18.50 net, 1000 tons dis. to Buenos Aires, and $19.50 net, with 750 tons dis. to Montevideo.

Swedish Concern Wants Coal from America

It is reported by an American consular officer that a company in Sweden is desirous of purchasing American coal and coke. Correspondence with the Swedish firm may be in English. Reference. The address may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its district offices, and asking for information on Opportunity No. 28,525.

United States Supplies Bulk of Brazilian Coal

The war has changed Brazil's import trade in coal, which was formerly entirely in the hands of Great Britain, to the United States. Of total imports valued at $23,343,069 in 1917, the United States supplied $19,087,107 worth. Although the c. i. f. value of the coal imported increased from $18,651,927 in 1916, the tonnage decreased from 1,024,487 tons in 1916 to 818,327 tons in 1917, the average price having risen from 75 to 114 milreis ($18.75 to $28.50) per ton. While the United States at present controls the coal trade, under the present selling methods it seems improbable that this trade will be retained. Although they have had four years of opportunity, not one of the important coal companies of the United States has found it expedient to establish a permanent coal depository, which is largely the secret of British success in this market in the past. The imports of coal briquets declined to an insignificant value of $137,046.

Exports of Anthracite and Bituminous Coal and Coke, by Customs Districts and Countries—December, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

Customs Districts	To	Anthracite, Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	Canada	3,541	...	55
Vermont	Canada	1,754	2,060	65
Massachusetts	Canada	75	...	...
	Newfoundland	20	195	...
St. Lawrence	Canada	87,298	169,433	1,412
Rochester	Canada	15,490	59,132	230
Buffalo	Canada	177,799	297,616	38,819
New York	France	...	...	2,530
New York	Italy	260	...	...
New York	Canada	3,285	...	...
New York	Newfoundland	1,039	...	...
New York	Salvador	...	...	22
New York	Barbados	10	...	...
New York	Cuba	10	...	...
New York	Virgin Islands	...	...	5
New York	Fr. W. Indies	...	...	3
New York	Santo Domingo	...	1,193	3
New York	Argentina	...	...	17
New York	Brazil	...	...	10
New York	Chile	...	...	39
New York	Colombia	10	10	10
New York	Uruguay	...	...	55
New York	Venezuela	...	10	...
Philadelphia	Cuba	1,003	1,032	...
Philadelphia	Uruguay	...	2,155	...
Maryland	Cuba	...	7,074	...
Maryland	Brazil	...	2,895	...
Maryland	Chile	...	...	3,378
Maryland	Peru	...	...	1,405
Maryland	Uruguay	...	20,934	...
Virginia	Netherlands	...	16,512	...
Virginia	Bermuda	...	349	...
Virginia	Barbados	...	1,719	...
Virginia	Jamaica	...	5,630	...
Virginia	Other Br. W. Indies	...	2,640	...
Virginia	Cuba	...	76,995	35
Virginia	Virgin Islands	...	1,538	...
Virginia	Dutch West Indies	...	3,113	...
Virginia	French West Indies	...	2,785	...
Virginia	Santo Domingo	...	2,621	42
Virginia	Brazil	...	19,079	...
Virginia	Chile	...	13,321	...
Virginia	Uruguay	...	18,269	...
Virginia	Canary Islands	...	6,531	...
Virginia	Portuguese Africa	...	5,908	...
South Carolina	Cuba	...	868	...
Georgia	France	...	1,128	...
Georgia	Cuba	...	1,620	...
Florida	Cuba	...	2,190	...
Mobile	British Honduras	...	13	...
Mobile	Guatemala	...	...	25
New Orleans	Guatemala	...	10	...
New Orleans	Honduras	...	385	...
New Orleans	Nicaragua	...	184	...
New Orleans	Panama	...	6,000	...
New Orleans	Mexico	...	9	35
San Antonio	Mexico	72	210	3,145
El Paso	Mexico	...	2,905	1,385
Arizona	Mexico	...	6,703	13,598
Southern California	Mexico	1	9	...
San Francisco	Guatemala	...	...	3
San Francisco	Mexico	...	...	10
Washington	Canada	...	192	970
Washington	Chile	...	2,500	...
Hawaii	British Oceania	...	3	...
Dakota	Canada	20	859	280
Duluth and Superior	Canada	32	437	25
Michigan	Canada	79	186,677	19,791
Ohio	Canada	16	186,804	5,698
Totals		292,014	1,140,455	93,100

COAL AND COKE NEWS

What Happened in January

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Jan. 1—The United States Fuel Administration removes all limitations on the duration of contracts for coal and coke made under order of Dec. 25, 1917, with amendment of July 26, 1918—United States War Department commences to handle its own coal requirements without reference to Fuel Administration—Men of Marvine colliery, of Hudson Coal Co., return to work [XV, 152].

Jan. 2—The United States Fuel Administration announces that it has induced the carbon-black manufacturers of Grantsville, W. Va., to cease using the natural gas of West Virginia for that purpose but to operate in Wyoming and Louisiana where gas cannot be otherwise utilized. This will save 15,000,000 cu.ft. of gas and 5000 gal. of gasoline per day—John E. Williams, Federal fuel administrator for the State of Illinois, dies at his home in Streator, Ill.

Jan. 3—Fire at the plant of the Steele Coal Co., Mossy Bottom, near Williamson, W. Va., destroys store and office buildings and causes a loss of $20,000.

Jan. 4—General March states that 6000 anthracite coal miners have been ordered released by the army [XV, 151]—Frank E. Harkness made Solicitor of United States Fuel Administration.

Jan. 5—George H. Cushing, since 1907 editor of the "Black Diamond," becomes managing director of the American Wholesale Coal Association—Practically all restrictions upon the sale and shipment of bituminous coal for bunkering purposes at points north of Cape Hatteras removed by order of United States Fuel Administration.

Jan. 7—Director of Railroads makes report to President in which he declares that the zoning law greatly helped the railroads in meeting the demands of the nation for transportation [XV, 150]—House of Representatives passes lignite bill, providing funds to determine the commercial practicability of using lignite in producing fuel oil, gasoline substitutes, ammonia, tar, solid fuels and gas for power and other purposes [XV, 191].

Jan. 8—George R. Sheldon, treasurer, Republican National Committee and director of the Union Colliery Co., is seriously injured at Dowell, Ill., by being crushed between a trip and the coal rib. Dies Jan. 14.

Jan. 9—Strike of 16,000 marine workers ties up more than 1000 boats in New York Harbor, causing railroad embargo —Burning natural gas in flambeaux, for outside light in daylight hours in inefficient apparatus, in larger quantity than needed, or in any manner not making efficient use of fuel, is forbidden.

Jan. 10—All fuel conservation provisions of Fuel Administration withdrawn, except those relating to waste of natural gas by free consumers or by inefficient appliances or through carelessness [XV, 165]—Restrictions on domestic and foreign shipments of egg and pea size of anthracite removed, though chestnut and stove continue to be restricted [XV, 165].

Jan. 14—The Cleveland & Western Coal Co. is fined $1000, to be paid to the Red Cross, for disposing of coal shipped to the McKinney Steel Co. for byproduct coke oven use. When the steel company said it had no need for the coal the coal company sold it to local consumers in violation of the zoning order—Explosion of gas at No. 9 mine of Pennsylvania Coal Co. seriously burned three men [XV, 209].

Jan. 15—Southport Miners' Federation demand that British Government demobilize all miners in army and require that corporations give them an increase in wage of 30 per cent. [XV, 210].

Jan. 16—Strike at Oneida colliery of the Lehigh Valley Coal Co., near Freeland, Penn., about the discharge of a careless man [XV, 193]—Store building and several dwellings of Standard Island Creek Coal Co., at Taplin, W. Va., are destroyed by fire [XV, 252].

Jan. 17—Fuel Administration announces that on Feb. 1 all district representatives would cease to function except for the purpose of preparing records of the work done to Jan. 31 [XV, 191]—Lawrence Mitchell, assistant business manager, is made property custodian of the Fuel Administration—Orders of May 16 and July 16, 1918, are suspended by Fuel Administration. These orders prohibited selling, shipping, delivering or distributing smokeless coal received at Lake Michigan or Lake Superior docks except for making illuminating gas, byproduct coke or coal briquets or other purposes designated by Fuel Administration—Coke and all coal, except Pennsylvania anthracite, is relieved of price restrictions and zoning rules. Filing of contracts with Fuel Administration is no longer required [XV, 191]—Director General of Railroads declares that Railroad Administration is not trying to force down coal prices [XV, 191]—Norfolk and Angle Tipple of Pocahontas Fuel Co. destroyed by fire [XV, 252].

Jan. 18—Strike for minimum wage at Heidelberg collieries, Nos. 1 and 2 ends Jan. 27 [XV, 238, 284]—Two men fatally burned in an explosion of gas at No. 2 shaft, Alden Coal Co. [XV, 252].

Jan. 20—Mine fire prevents six men from escaping from Mt. Braddock mine of the W. J. Rainey Co., Mt. Braddock, Fayette County, Pennsylvania. Two men lose lives in rescue work. The six men are ultimately rescued on Jan. 24 [XV, 252, 272].

Jan. 21—Harold B. Harris appointed Custodian of Records, Fuel Administration [XV, 237]—Cage in Hammond colliery shaft near Shenandoah frees itself of the guides and tears timbers loose so that they fall to the shaft bottom [XV, 252] —No. 5 breaker, of Hudson Coal Co., destroyed by fire [XV, 252].

Jan. 22—Fuel Administration decrees that all orders for the requisition of coal and coke are cancelled and annulled from Jan. 31 onward [XV, 236]—Fuel Administration announces that the Bureau of Labor, which works under the Fuel Administration, will continue its existence till the close of the war [XV, 238]—Employees of Yorkshire, England, mines, numbering some 150,000 men, go on strike for an extra 20-min. lunch time [XV, 239].

Jan. 23—Convention of miners in Winding Gulf field meets at Beckley, W. Va., to discuss a new wage scale which, as decided on by the convention shall give 12c. per ton more to miners and $1.50 to $1.75 per day to day workers [XV, 239].

Jan. 24.—George E. Howes is appointed historian of Fuel Administration.

Jan. 28—Shipping rates from the United States to the United Kingdom, Havre, Bordeaux, Antwerp, Rotterdam, Marseille, Cette, Genoa, Naples, Colombo, Calcutta, Rangoon and Madras reduced by British Ministry of Shipping roughly two-thirds—The ratification of the Prohibition Amendment to the United States Constitution is officially announced by the Secretary of State.

Jan. 29—War Trade Board announces that the government of Great Britain will on Mar. 1 prohibit the importation of specified classes of manufactured goods from the United States—Mine workers open coöperative store in Shenandoah [XV, 284]—Three miners are killed by the explosion of a pocket of gas at Goodyear Mine, Smoky Run, in Clearfield County, Pennsylvania [XV, 295].

Jan. 31—Treasury Department and Department of Interior reassume control of the supply of their coal requirements without reference to Fuel Administration—Orders of requisition for coal and coke are annulled—Maximum prices for anthracite suspended, also all other coal and coke regulations but three [XV, 282].

Harrisburg, Penn.

Senator Albert Davis of Lackawanna has introduced in the Senate a bill aimed at remedying the mine cave conditions as they exist in Scranton and the immediate locality. The bill was drafted by Draper Lewis, former dean of the school of law, University of Pennsylvania.

The bill makes it unlawful to mine or remove coal as to cause the collapse of any public building or structure used as a place of resort, assemblage or amusement, including churches, schools, hospitals, theaters, hotels and railroad stations, also streets, highway roads, bridges or other public passageways, any tracks, roads, pipe lines, wires or other facilities used in the service of the public by any municipal corporation or public service company as defined by the public service company law.

Persons upon conviction of violation of the first provisions will be subject to fine not exceeding $5000, one year's imprisonment, or both, at the discretion of the court. Every president, director, general manager, superintendent or other person having supervision over any mine or mining operations, who wilfully participates in or connives at any violation of any of the provisions will be liable to the penalties.

A subsidence of the surface will constitute prima facie evidence and prosecution for violation of the act may commence at any time within two years from the time the subsidence appears on the surface. A threatened violation of the provisions may be restrained by an injunction. If one section of the Lewis act is declared unconstitutional it will not affect the other provisions of the measure.

The bill drawn up by Dr. Lewis differs greatly from the bill which Senator Davis intended introducing, which was the one got up by the Scranton Surface Protective Association. Probably the most radical difference is that the measure takes in all coal operations, whether it be anthracite or bituminous. The Surface Association bill specified anthracite operations alone.

As the bill includes all coal-mining sections in its provisions, there will be a greater number of representatives and senators interested in it during its course through legislative channels. It is understood that arrangements are already being made for a public hearing on the bill. This will in all likelihood be held within a month.

Senator Crow has introduced a bill which provides that the Secretary of Internal Affairs be made the custodian of all deeds, contracts, maps, surveys and other documents or instruments relating to the titles of real estate owned or hereafter to be acquired by the Commonwealth.

Charleston, W. Va.

Coal production has grown less and less in West Virginia, making it certain that February would prove to be one of the poorest months in recent years in point of production. From the first of February, when so many companies shut down their mines, until the latter part of that month many mines in addition were closed down because of lack of orders. Inasmuch as most of the mines of the state are not operating on more than a 25 per cent. basis, that means of course that they are being operated on an average of only one or two days a week. Idleness so prevalent throughout the coal fields of West Virginia has been relieved here and there by orders, but a resumption in such instances has been more than met by a suspension of operations at the plant of other companies.

Throughout all the depression so much in evidence in recent months producers of coal in West Virginia have not yielded in price, and during the week ending Feb. 22 except in rare instances coal prices were being maintained. Coal men know that in the course of the next 30 or 60 days business will pick up, because at this moment

coal is being used faster than it is being mined. For that reason it is freely predicted that there will be a slight improvement in the demand by Apr. 1 and that by July 1 there will be a general resumption of trade.

In West Virginia just at this time demurrage costs are cutting a considerable figure, not only because of the high demurrage rates, but because of the gamble indulged in by many operators in loading empties at their disposal and trusting to the receipt of orders sufficient to utilize the cars loaded. There have been brought to light several instances recently where small operators have had stiff demurrage bills to meet because of the producer taking a chance on getting orders.

One Virginian field operator finds high ocean rates and excessive demurrage rates operating to clog the wheels of the mining industry. He happened to have a personal interest in a recent demurrage case where one car in excess of the number ordered was shipped to the South and refused by the consignee. The car being on a branch line, it was found difficult and even impossible to get rid of it. After the consignor had been attempting for some time to dispose of the extra car of coal, he was notified by a railroad company of the high rate of demurrage running against the unloaded car. The only way the consignor was finally able to get rid of the car was by giving it away and by paying the donee $60 for unloading it in addition to demurrage charges of $123.80 and the expense of the trip. With ocean rates high and with strikes in swing in so many South American points, the Virginian field operator pointed out the futility of trying to market coal in South America at the present time.

New York, N. Y.

Samuel B. Crowell, who was the retail coal-dealer advisor on the staff of Federal Fuel Administrator Garfield, at the meeting of the New York State Coal Merchants' Association at the Hotel Pennsylvania, New York City, on Feb. 27, said that cooperation of the three branches of the coal trade is most essential; that is to say, between the operator, the jobber and the retail distributor.

The association adopted resolutions protesting against amendments now pending in the State Legislature to the workmen's compensation law, and to the bill to establish a system of compulsory health insurance for the benefit of the employees and their dependent families, which requires the employer to contribute in all cases not less then 50 per cent. of the cost of the insurance, and in some cases three-quarters or the whole of it.

Arthur F. Rice, Commissioner of the Coal Merchants' Association of New York, predicted that coal prices will come down, but that the most optimistic man cannot expect to see this done at once. There must be a rather gradual reduction in the cost of labor and materials first. That the readjustment will and must come is certain; and the indications are that it is not far off.

Other speakers included Harry T. Peters, of Williams & Peters, and S. Brinckerhoff Thorne, of Thorne, Neale & Co., who was a member of the Fuel Commission sent to Europe by the U. S. Fuel Administration last October.

Failure of the marine workers and boat owners to come to an agreement resulted in a strike order being issued by the workers late on Monday of this week, involving about 16,000 men. If effective it would result in a complete tying up of the tugs and barges in the New York harbor. At the time the order was issued it was said that the only exemptions would be army transports and hospital ships returning from France with soldiers. The strike order became effective at six o'clock Tuesday morning.

The men stopped work several weeks ago when their demands for an eight-hour day and wage increases were refused by their employers. At that time President Wilson instructed the War Labor Board to take hold of the situation and the men returned to work pending a hearing conducted by the Government. Subsequently the entire matter was referred to V. Everit Macy as umpire, and last week he handed down his decision granting the workers an eight-hour day, but without increased pay.

The men did not take kindly to the award and resumed their strike talk with the result that after several conferences the private boat owners organization on Monday of this week made three concrete propositions as follows: That the workers accept the Macy award; That the workers accept a wage increase (amount not stated) and working conditions remain as they now are; that the workers deal with the private boat owners and create a joint board to adjust their differences.

PENNSYLVANIA

Anthracite

South Scranton—Coal underlying the Daniel Webster and Wendell Phillips school buildings has been purchased by the school board at a cost of approximately $1000, according to deeds recorded. The coal in place was purchased for 35c. a ton. In selling the coal, the company stipulates several reservations, among them being that the Delaware, Lackawanna & Western, Coal Department, has no right to remove the coal, but that the company is allowed to make tunnels and passages and that they they shall incur no liability whatever from damages which may occur from caves or any other cause.

Minersville—The Oak Hill colliery, which has been idle for three weeks because of the dullness in the anthracite business, resumed operations on Feb. 26, giving employment to 800 men and boys. Another indication of revival in the anthracite business is the development of a big tract of coal land at Port Carbon, begun on Feb. 25. There are millions of tons of coal in this tract. The big Westwoods culm banks, owned by the Philadelphia & Reading Coal and Iron Co., have been leased to George Keiser, a well-known independent operator, and preparations have begun for the immediate marketing of the half million tons of coal there. These banks were deposited in 1860 and are rich in pea coal and nut coal, while the river nearby makes the work of washing easy.

Hazleton—M. S. Kemmerer & Co., operators of Sandy Run Colliery, have suspended operations and are taking out their pumps and mining equipment. The store has been closed and all work stopped. The mining conditions at this colliery have been unfavorable for some time, a squeeze having made coal recovery very expensive. Many of the suspended miners have found work with the G. B. Markle Co. and are removing their families to Freeland. Stripping contractors look forward to a prosperous summer season, although at present, their equipment is idle. The Lehigh Valley Coal Co. will strip the basin, between its Spring Brook and Spring Mountain collieries. The newly organized Raven Run Coal Co. is reported to have a stripping proposition under consideration at Raven Run.

Jeddo—The Mexicans employed by the G. B. Markle Co. at this place have nearly all left. The management announces that no more will be employed.

Scranton—The Lackawanna Coal Co. closed two of its collieries at this city and will prepare the coal at other breakers due to the cheaper underground haulage cost.

St. Clair—The Buck Run Coal Co. (Neale & Thorne) has taken over the Ellsworth colliery of G. M. Keiser, located near this place. The colliery is on a Philadelphia & Reading Coal and Iron Co. tract, and consists of a small breaker and washery, with a capacity of 300 tons per day.

Scranton—In the producing of 10,027,901 tons of coal in the fifth, sixth and seventh inspection districts of Lackawanna County during 1918, 60 men lost their lives, 133 were injured, 55 wives were widowed and 146 children orphaned. The number of tons produced per fatal accident, inside and outside, was 460,212, and the number of persons employed per fatal accident was 827. Reports from the remaining four districts have not been compiled.

Taylor—Satisfied that the company was negligent in not providing a safety block at the head of the shaft, a coroner's jury, sitting at an inquest into the death of the two men killed in an accident at the Greenwood shaft of the Hudson Coal Co., place responsibility for the accident upon the coal company. Witnesses testifying at the inquest stated that a headblock at the head of the shaft had been removed two months ago, and had not been replaced. Two men were killed and two others seriously injured when two runaway mine cars crashed into the mouth of the shaft, falling down upon the cage on which the men were riding.

Wilkes-Barre—A mine fire on No. 13 plane, Baltimore vein, that had gained considerable headway in the South Wilkes-Barre No. 5 colliery of the Lehigh and Wilkes-Barre Coal Co., was discovered on Feb. 21, and after attempts to put the fire out by means of water and other materials had failed to check it, that portion of the mine where the fire is raging was sealed up on Feb. 23. A concrete wall has been placed at all openings leading to the fire. This wall will have to remain for an indefinite period before it can accomplish its purpose. The fire will in no way interfere with the output of the colliery.

Freeland—The East Point Coal Co., operator of the Pond Creek colliery near Freeland, Penn., has closed its mine for an indefinite period. Three hundred men are made idle by the suspension. The Spring Brook and Spring Mountain operations of the Lehigh Valley Coal Co. have been completely shutdown. The mules have been hoisted and their shoes taken off; foremen are manning the pumps. Lumber is on hand to repair the Spring Mountain breaker. The union officials are much concerned over the idle mine workers, and consulted with General Manager Thomas, who promised them early action.

Bituminous

Vintondale—Etta Gibson and others have sold the coal underlaying a tract of 112 acres in Buffington township, Indiana County, to the Vinton Land Company, a subsidiary of the Vinton Colliery Co. The consideration was $10,722.65.

Savan—The Dor-Mar Coal Co. put its new plane and tipple into commission last week and is now loading coal from one of its mines on the John Hamilton farm. Work has also been started on a new opening in the Upper Freeport vein and the first timbers were put into place the same day the new tipple was put into commission. Both mines will load over the same tipple. Shipments are made over the Buffalo, Rochester & Pittsburgh Railroad.

Hollidaysburg—For several months the Allegheny Water Co. has had an injunction against the Russell Coal Co., of Altoona, to prevent the latter from constructing a tram road and tipple on a portion of the watershed which supplies the City of Altoona with water. The building of the tram, which would be about 3000 ft. in length, would shorten the coal haul to Altoona by about six miles and put the coal on the Buckhorn Pike only three miles from the city. The court succeeded in bringing the two companies to an agreement by changing the proposed tram road to another point. This was agreed to by both companies and will operate to better advantage for both parties. The tram will be constructed immediately and will relieve Altoona of any future coal shortages. Electric locomotives will be installed in the mine and on the outside tramroad.

Indiana—According to the annual report of Mine Inspector Thomas S. Lowther, of the 25th district, for the year 1918 there were 6,191,735 net tons produced, of which 6,082,332 were shipped to market. There are 65 mines in operation employing 5758 men; six of these mines are new operations opened during the year. There were 16 fatal accidents, 14 being inside the mines and two outside. There were 386,983 tons of coal produced and 360 men employed per fatal accident. There were 89 non-fatal accidents, 79 of which were inside the mines. There were 65 persons employed per non-fatal accident. All the mines of the district are in Indiana County. The largest producer was the Jefferson and Clearfield Coal and Iron Company with a production of 1,894,776 tons and the Pittsburgh Gas Coal Co., second, with 1,188,460 tons.

Irwin—The production of coal of the bituminous mines in the Nineteenth District in the year 1918 was among the respective companies as follows: Westmoreland Coal Co., 2,310,440; Ocean Coal Co., 827,078; New York and Cleveland Gas Coal Co., 590,897; United Coal Corporation, 465,443; Keystone Coal and Coke Co., 428,210; Irwin Gas Coal Co., 229,240; Delmont Gas Coal Co., 218,819; Union Coal and Coke Co., 157,773; Irwin Valley Gas Coal Co., 80,698; W. B. Skelly Coal Co., 78,232; Eiseman Coal Co., 64,362; Export Mining Co., 44,600; McAllister & Gray Coal Co., 41,657; Salem Gas Coal Co., 40,344; Westmoreland Gas Coal Co., 39,138; A. H. Pollins, 37,704; Cambria Steel Co., 36,650; Byerly Gas Coal Co., 35,421; Edwards Coal Co., 29,290; Larimer Gas Coal Co., 27,825; miscellaneous companies, 90,861; total, 5,874,682 net tons. All the mines are in Westmoreland County.

Greensburg—Inspector J. J. McDonald of the Eleventh bituminous district, which includes the region surrounding Greensburg, in his report for 1918 shows that the total production of coal in his district was 6,889,298 tons, of which Westmoreland county contributed 6,631,534, and Fayette county 257,764 tons. Of the companies the heaviest producers were the H. C. Frick Company, with 3,315,772 tons; the Keystone Coal and Coke Company, 1,227,184 tons; the Jamison Coal and Coke Company, 739,150 tons; Greensburg Coal Company, 450,769 tons; and the Mount Pleasant-Connellsville Coke Company, 328,528 tons.

Brownsville—The controversy between J. Harte Hillman, Jr., of Pittsburgh, Penn.,

President of the Hecla Coal and Coke Co., and T. J. Brennan, of Uniontown, Penn., president of the Thompson-Connellsville Coal and Coke Co., over the control of the latter company, which it was announced last week had been settled out of court, has been settled by agreement that no special meeting of the stockholders would be held at this time to elect new officers, but that Mr. Brennan would retain the presidency till the next regular meeting of the directors next July.

WEST VIRGINIA

Glen White—Some changes are to be made in the plans of the E. E. White Coal Co. in connection with the construction of a steel tipple at this place. The company had a complete survey made by a New York firm of engineers and upon consideration of a report made by the engineers will broaden its plans somewhat with a view to securing the greatest results in mining and loading coal from the various seams under development.

Fayetteville—Additional and unlooked-for orders have enabled the New River & Pocahontas Consolidated Coal and Coke Co. to start its mines at Minden going again, the plants having been closed down for two or three weeks because of insufficient orders. When operations were suspended at the Minden mines it was feared that it would be for an indefinite period, but unexpected orders caused a resumption of operations.

Philippi — Coal companies and coal properties located in various parts of the state which have been under the control and management of William Taylor George, of Philippi; A. A. Lilly, of Charleston; Samuel Morans, of Youngstown, and others, have been acquired by the Beacon Coal and Land Co. Among such properties are the Randolph Smokeless Coal Co. and the Hartlands, Rich Mountain, W. Va., said to be worth $225,000; Clay County Fuel Co., located near Hartland, $65,000; Morans Coal Co., Middle Creek, Clay County, $60,000; and 85 acres in the Jones tract at Wilmoth.

Rosebud—G. M. Shoemaker & Co., whose offices are at Clarksburg, W. Va., have taken over the property of the J. M. Macdonald Coal Mining Co., of this place, consisting of the Rosebud Nos. 1 and 2 mines, the Gilbert, on the Baltimore & Ohio Short Line, and the Hornor mine, at Hornor, W. Va., on the Weston & Pickands division of the Baltimore & Ohio. The combined capacity of the four mines is about 20,000 tons per month at present, but the new owners expect to increase this materially within a short time. The Matthew Addy Co. is to act as the sales agent for all operations.

Clute—Officers have been elected and plans perfected by the Belick Knob Coal Co., reference to which was made in *Coal Age* a few weeks ago. The new company will be headed by Thomas M. Davidson, of Huntington, with W. A. Garrett, of Charleston, as secretary and treasurer. Operations will be under the direction of Floyd B. Thompson. The plant of the company, as already indicated, is to be built at Clute, Fayette County, where the company will have its operation. It will require about three months to construct the plant, but at the end of that time the company expects to be able to begin the mining and shipment of coal. While the plant is under way the offices of the company will be located at Clute. New River coal will be produced, the company planning to develop part of a tract of 400 acres of coal secured from the Sewell Valley Coal Co.

OHIO

East Palestine—J. A. Meek, of East Palestine, has purchased the Mollenkopf farm near here and is planning to open a coal mine in No. 6 seam. The vein is 4 1-2 ft. thick.

Wellston—The United Mine Workers recently in session at this place adopted a resolution asking the Railroad Administration to purchase in Ohio coal used on Ohio railroads. It was claimed that some Ohio roads are using West Virginia coal.

INDIANA

Brazil—The Clay Products Co., operating two large plants near here, have leased the Austin Shattuck farm of 300 acres near Hoosierville and will begin at once to remove the coal and clay products underlying the land. By leasing this tract the company will be able to mine its own coa, there being a fair-sized deposit of good grade block underlying the farm.

ILLINOIS

Cuba—Mine No. 1 of the Donk Coal Co. has closed down indefinitely. It employed several hundred men.

Springfield—The state miners' examining board will hold a test in this city Mar. 15. Other dates for examinations are as follows: Mar. 6, Duquoin; Mar. 7, Christopher; Mar. 8, Harrisburg; Mar. 10, West Frankfort; Mar. 11, Herrin; Mar. 13, Belleville; Mar. 14, Staunton; Mar. 17, Danville; Mar. 19, Peoria; Mar. 20, Canton; Mar. 21, Macomb.

Hanna City—Through the efforts of W. E. Kidd, state mine inspector, a permanent organization has been effected of Hanna City miners in first-aid relief work. A class of 52 miners has been under instruction. It is said that the work will be organized in every mine local in Illinois. Alexander Miller, of the United States Bureau of Mines, assisted by Mr. English, of the Illinois State Department of Mines and Mining, were also active in the work.

Du Quoin—Coal mining is practically at a standstill in this section. The 1500 men employed at the respective mines here are putting in only two or three days per week as a result. With the exception of the Kathleen mine, located at Dowell, five miles south of here, the mines have not averaged over three days a week for some two months or more, while without warning, about three weeks ago the Dowell mine joined in with the rest and is now working about half time.

Du Quoin—George W. Leek, financial secretary of the Elkville miners' union, is the author of a resolution, which if adopted by the Illinois miners' organization, will provide a benefit of $2000 for the family of every miner at his death. At this time the family of each miner receives $250 at his death. There are 80,000 union miners in Illinois, and Leek declares his idea will prove to be a practical solution of the problem of supporting the dependents of the members of that organization.

Springfield—Tonnage figures compiled by the Illinois Department of Mines and Miners show the great falling off after the signing of the armistice. In October 8,286,000 tons were hoisted, in November 6,286,000 and in December 6,000,000 tons. For the year ending June 30, 1918, a record of approximately 90,000,000 tons was set; and if the war had continued it was expected that 100,000,000 tons would have been reached for the year ending June 30, 1919. The average normal yearly tonnage is between 50,000,000 and 60,000,000.

Centralia—Because of the congested conditions which have developed between Du Quoin and Centralia in the last year and a half, the Illinois Central Railroad Co. has made extensive improvements in its equipment which will greatly facilitate the handling of coal. A five-stall roundhouse is being erected at the north end of the switch yards at Du Quoin, and this will be completed soon. In addition to this the company has excavated an immense reservoir near the site of its old reservoir at Du Quoin, which is not large enough to supply the demand that will exist as soon as the new roundhouse is in use. The water will be piped underground from the reservoir to tanks near the roundhouse.

KANSAS

Frontenac—The Dittman-Wachter Coal Co. has recently completed a new washhouse at its mines here. The building is modern in every respect and will fill a long felt want.

Foreign News

Minto, N. B.—Nearly all the coal mines in the Grand Lake mining field have been closed because of the unsatisfactory conditions of the coal market. The only mines in operation are those of the Minto Coal Co., which are only kept going because the company has large contracts with the Canadian Pacific Railway Co. The Government has been asked to have the output of other mines used on the Canadian National Railways to make it possible for them to resume operations.

Victoria, B. C.—The total coal production of the coal mines of British Columbia for the month of January, 1919, was 243,516 tons, which represents an increase of 31,509 tons over the production of the month of December, 1918. There was a drop in output tonnage at the Corbin (B. C.) colliery and Princeton (B. C.) collieries, which was due in the former case to weather conditions and in the latter to a fire in the mine. The loss would amount to approximately 3000 tons.

Edmonton, Alta.—The annual report of John T. Stirling, chief inspector of mines for Alberta, shows the production during 1918 of 6,148,620 tons of coal, 100,470 tons of briquets and 32,858 tons of coke. The nnmber of mines in operation during the year was 317, including 70 new mines and nine which had been reopened. The number of mines abandoned was 71. The average number of men employed was 2633 above ground and 6141 below ground. The number of fatal accidents was 21, and there were 16 serious accidents. Of the total amount of coal mined during the year 3,440,154 tons was sold in the province, 101,189 tons in British Columbia, 1,372,439 in Saskatchewan, 511,168 in Manitoba, 629 in Ontario and 133,276 tons in the United States.

Personals

A. A. Straub has been elected vice president and general manager of the Superba Coal and Coke Co., Frick Building, Pittsburgh, Penn., effective Jan. 1, 1919.

William H. Brown, of Gloucester, Ohio, general superintendent of the Ohio Collieries Co., has resigned his position, effective when his successor is appointed.

F. J. Patton, secretary of the Northern West Virginia Coal Operators' Association, Fairmont, Va., has resigned his post in order to devote his entire time to his personal business.

W. T. Miller, formerly of the freight traffic department of the Pittsburgh & Lake Erie R.R., Pittsburgh, Penn., has been appointed traffic manager of the Industrial Coal and Coke Corporation, New York, N. Y.

J. A. Jefferis, of St. Louis, Mo., manager of the Kerens-Donnewald Coal Co., has been appointed fuel agent of the Illinois Traction System, which requires an annual tonnage in excess of 500,000. He will continue to make his headquarters in St. Louis.

W. T. Burgess, superintendent of coal-mining operations of the Bessemer Coal, Iron and Land Co., at Belle Ellen, Ala., has resigned his position to accept one as safety inspector of coal mines for the Republic Iron and Steel Co., effective Feb. 15. Mr. Burgess will have his headquarters at Sayreton, Alabama.

A. B. McLaren, president of the Citizens Trust and Banking Co., Marion, Ill., and manager of the Chicago and Big Muddy Coal Co.'s properties, has accepted the superintendency of the O'Gara properties at Harrisburg, Ill., to succeed **R. M. Medill.** The O'Gara interests have twelve mines in operation in Illinois and Indiana.

George E. Henry, for several years president of the Allegheny Valley Operators' Association, at the annual meeting in Kittanning, Penn., definitely retired and L. B. (Doc.) Lewis, manager of the Acme Coal Co.'s mines at Rimersburg, was elected president in his stead. Mr. Henry stated that he begun business as a miner at $1 a day. He retires with a fortune.

Thomas Houlton, of Gloucester, Ohio, has resigned as electrical and mechanical engineer for the George M. Jones interests, comprising the Ohio Collieries Co. in the Hocking Valley and Cambria Collieries Co. near Bellaire, Ohio, and has opened an office as consulting mechanical and electrical engineer at Johnstown, Penn. Mr. Houlton before going to Ohio about a year ago was for several years master mechanic for the Merchant Coal Co. and the United Coal Co.

Clarence E. Patrick has been appointed district sales manager for Rockford, Ill., for W. P. Rend & Co., who have mines in the Hocking field of Ohio, as well as in the Franklin County district of Illinois. Until recently Mr. Patrick was vice president of the Calloway Fuel Co., of Milwaukee, but resigned, and made a connection with the Rends. Mr. Patrick has been in the coal business for a number of years, having represented Moderwell & Co. in northern Illinois before that concern sold out to the Old Ben Coal Corporation.

Obituary

Charles Albert Bowman, aged 40, superintendent of the Lincoln Highway Coal Co., died Feb. 11, of pneumonia, at his home in Pittsburgh, Penn.

W. P. W. Haff, a well known coal man, with offices at 1 Broadway, New York, N. Y., died in Los Angeles, Cal., Feb. 23. Mr. Haff went to California for his health in December last and was thought to be improving. His home was in Freeport, L. I.

Charles H. Zeller, aged 47, for many years an operator in the block coal and bituminous fields in the vicinity of Brazil, Ind

died Jan. 30 of a complication of diseases. He was the son of John H. Zeller, one of the early and most successful operators in the block coal field.

M. J. Murray, Sr., coal operator and banker, of Dunmore, Penn., died at his home on Feb. 26, after an illness of several months duration. Mr. Murray was born in Ireland Mar. 10, 1846, and came to Dunmore at the age of 7. For many years Mr. Murray operated a colliery at Dunmore, and in 1905 leased 464 acres at Bernice, Sullivan, and organized the Northern Anthracite Coal Co. Mr. Murray was interested in several banking institutions, coal properties and other industries.

Samuel Gillies, president of Gillies-Guy, limited, Hamilton, Canada, died in St. Petersburg, Fla., on Feb. 22, aged 78. The company was one of the largest distributors of coal, both bituminous and anthracite, in Canada. It had been established by Mr. Gillies in 1906, who had formerly been in the lumber trade in Saginaw, Mich. He had been one of the leading citizens of Hamilton, but of late years had been out of health. He leaves a widow and three sons, David H., in the coal business at London, Canada, and Samuel R. and John W. Gillies, in business with the father.

Sir Guy Spencer Calthrop, comptroller of English coal mines since 1917, died on Sunday, Feb. 23, in London, England, of influenza. Sir Guy, who was created a baronet in 1918, was born in 1870 in Uppingham, Rutland, and was a nephew of the late Viscount Alverstone, and was general manager of the London & Northwestern Ry. He was general manager of the Caledonian Ry. in 1908, and general manager of the Buenos Aires & Pacific Ry. in 1910. In February, 1914, Sir Frank Lee, the general manager of the Northwestern, died, and Guy Calthrop, then aged 41, was appointed to fill the vacancy, the youngest man who had ever controlled the line.

Trade Catalogs

Green's Economizers.—The Green Fuel Economizer Co., Beacon, N. Y. Bulletin No. 151. Pp. 63, 8½ x 11 in., illustrated. A summary of the facts regarding Green's improved patented fuel economizer.

Local Battery Telephones. Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y. Bulletin No. 1024. Pp. 22; 7¾ x 10 in.; illustrated. Contains complete information about the company's wall telephones.

Repair of the German Ships. Wilson Welder and Metals Co., Inc., New York, N. Y. Tells how the wrecked machinery on the German ships lying in American ports was repaired by electric welding with the aid of the Wilson-Plastic-Arc welder.

"C. J." Coal Meter. C. J. Manufacturing Co., Philadelphia, Penn. Folder. Pp. 6, 4 x 9 in., illustrated. Describes the uses and system of operation of a coal meter that can be used on any underfeed stoker having an accessible revolving shaft.

Hercules Products. Hercules Powder Co. Catalog. Pp. 144, 6 x 9 in., illustrated. Book will prove valuable to users and prospective users of explosives. It contains a general description of products manufactured and marketed by the Hercules Powder Co.

A Chain of Evidence. Morse Chain Co., Ithaca, N. Y. Publication No. 16—"Small Power Drives." Pp. 24, 6 x 9 in., illustrated. Enumerates the advantages of Morse chain drives. Illustrated by many photographs of actual applications of medium power drives.

Modern Methods of Ash Disposal. American Steam Conveyor Corporation, Chicago and New York. Catalog. Pp. 160; 7¾ x 10½ in.; illustrated. A presentation of the most economical and efficient methods of moving ashes, soot and combustion waste from boiler room to disposal station.

The Art of Jigging Coal.—G. H. Elmore, Philadelphia, Penn. Bulletin. Illustrated, pp. 13, 8 x 11 in. One of a series of bulletins describing the Elmore jigs. This bulletin concerns the washing of bituminous coal for fuel with Elmore 600-A jigging machines equipped with automatic refuse control.

The Jeffrey Pivoted Bucket Carrier. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 210. Pp. 96; 6 x 9¼ in.; illustrated. Gives details of the carrier and illustrates large power plant equipment. A feature of the catalog is the reproduction of dimensioned blueprints in actual color of typical views for the various sizes of carrier equipment.

Ingersoll-Rand High Speed-Piston Valve Steam Engine, Class FD. Form 9026. Pp. 12, 6 x 9 in., illustrated. Engine is of the horizontal center-crank type, and the steam valve is of the most approved design, permitting the use of the highest steam pressures and superheated steam. Catalog contains cross-sectional illustrations showing the machine in detail.

Geared Marine Steam Turbines. De Laval Steam Turbine Co., Trenton, N. J. Bulletin M. Pp. 32, 8½ x 11 in., illustrated. New publication describing the details of construction of turbines and gears and also various turbine-driven auxiliaries, including lighting sets, circulating pumps, boiler feeders, etc. A new development is the centrifugal pump for the continuous purification of the oil used in the turbine and gear bearings and on the gear teeth.

Industrial News

Auburn, N. Y.—The Columbian Rope Co., manufacturer of Cordage, has issued an attractive poster, in colors, showing the lowering of a lifeboat at sea. The poster is suitable for hanging.

Uhrielville, Ohio—The Walnut Coal Co. has been incorporated with a capital of $10,000 by John W. Lindsay, Archie Stevenson, Freeman Wilkinson, Anna V. Lindsay and Matilda Stevenson.

Cincinnati, Ohio—The Walter-Wallingford Coal Co. has been chartered with a capital of $100,000 by L. F. Walter, B. A. Wallingford, C. S. B. Ward, Samuel H. Whitaker and A. J. McCarthy.

Terre Haute, Ind.—The Vicksburg Coal Mining Co. has been incorporated here with stock of $30,000. The directors for the first year are Horace W. Robertson, Walter Robertson, William H. Kivits and Albert F. Kivits.

Columbus, Ohio—The Mount Cherry Coal Co. has been incorporated with a capital of $600,000 to mine and sell coal. The incorpators are Warren B. Ferris, Herman Eckhardt, Thomas M. Hardesty, Henry J. Mayer and Ernest H. Whiting.

Minneapolis, Minn.—The Reliance Coal Co., of Minneapolis, has obtained the exclusive agency in the Northwest for the Columbus Mining Co.'s "Lafayette" and "Columbus" coals from southeastern Kentucky. It is estimated that the deal will involve about 75,000 tons of coal per year.

Cincinnati, Ohio—The Dickinson Fuel Co., which operate mines in West Virginia, is preparing to enter this territory as a distributor and will construct distributing yards and hoppers at points to be selected on the Chesapeake & Ohio and Norfolk & Western railroads, on both of which it has mines.

Pittsburg, Ky.—W. R. Grant, Pittsburg, has recently completed negotiations for the leasing of approximately 450 acres of coal properties in the vicinity of High Splint, Ky., and is understood to be arranging plans for early development. The property is held by the Cooper Ridge Coal Co., of Evarts, which recently increased its capital to $75,000.

Youngstown, Ohio.—In its annual report to stockholders, it is interesting to note that the Youngstown Sheet and Tube Co has invested a total of about $2,500,000 in the development of its coal properties in Greene County, Pennsylvania. The mine, which fronts on the Monongahela River, has a capacity of about 450 tons daily. James A. Campbell is president.

Ithaca, N. Y.—The Morse Chain Co. announces that it is advised by P. A. Morse, of the Morse Engineering Co., western representatives, St. Louis, Mo., that the Kansas City offices have been removed from the old quarters in the R. A. Long Building, to more commodious rooms, Suite 211-212, Finance Building. W. V. Warner is the office district manager.

Panama, Okla.—The Buck Creek Coal Co. has been organized here, with a capital stock of $15,000, and charter has been filed with the Secretary of State at Oklahoma City. The incorporators are A. W. Breckenridge, of McAlester; Thomas L. Tatum, of Milton; and William T. Harper, of Fort Smith, Ark. The company will develop its coal lands in eastern Oklahoma.

Mobile, Ala.—During the past week a number of boats loaded with steam or bunker coal at Mobile, the fuel being sent by rail and Warrior River barges from the Birmingham district, to supply the demand for the service between Mobile, Cuba and South America. The Louisville & Nashville R.R. has put in a coal-loading device on the Mobile water front, and is prepared to handle almost any amount of coal for the ocean-going steamers.

Charleston, W. Va.—A coal-carrying railroad will top certain coal lands in Greenbrier County, the new road to be known as the Greenbrier & Eastern. It is to be financed by Charleston people who are interested in the coal properties which the railroad will make it possible to operate. The company will have an authorized capital of $50,000. It was organized by B. B. Brown, Angus W. McDonald, O. P. Fitzgerald and L. G. Cunningham, all of Charleston.

Birmingham, Ala.—Coal production for the Birmingham district during the week ending Feb. 15 was 281,284 tons, according to reports turned in at the Alabama Coal Operators' Association. The final report of production for the previous week was 274,442 tons. Coal production for the past two weeks is more than 100,000 tons below the estimates made by experienced coal men. The reduction in output, according to operators, is due to labor shortage and lack of market.

Cincinnati, Ohio—Executive committee of the recently organized Central Coal Association, comprising coal operators in West Virginia, Kentucky and Ohio, has selected as the secretary of the organization Guy M. Freer, for several years manager of the traffic department of the Cincinnati Chamber of Commerce, and a man especially well posted on the problems of the coal trade in this section, especially in the matter of transportation. The offices will be located in Cincinnati in charge of Mr. Freer, who will give all of his time to the work.

Canton, Ohio—C. A. McDonald, president of the Canton Coal Co., has been elected president of the Central Ohio Coal Operators' Association at the annual meeting of the board of directors held recently. He succeeds E. E. Fox, an official of the Goshen Coal Co., Massillon, who has been president of the association for a number of years. John Kite, vice president of the Midvale-Goshen Coal Co., Massillon, was elected vice president, and William H. Haskins, commissioner, was reëlected secretary and treasurer. The headquarters have been moved to Canton.

Louisville, Ky.—Figures relative to coal consumed in Louisville during the year 1918 show that a total of 1,618,021 tons of rail coal came into the city, 89,046 tons of river coal and 4928 tons of anthracite, the latter during the first six months of the year. This makes a total of 1,707,067 tons of bituminous, and a total of 1,711,995 for all grades. These figures show an increase of 1,600,000 tons over the previous two-year average of the Fuel Administration. Kentucky is figured on for 5,600,000 to 5,700,000 tons annually. Some river coal was delivered during each of the ten latter months of 1918, the first two months finding the river blocked with ice.

Charleston, W. Va.—Only one measure affecting the coal industry of the state in addition to the Hale bill reorganizing the Department of Mines was finally acted upon by both houses of the West Virginia Legislature, and that was the Lewis bill. This bill amended Section 17 of Chapter 15H of the Code. The clause amended read: "And in no case shall more than ten persons ride on any cage or car at one time," the section covering shaft, slope and incline mines. The clause as amended reads: "And in no case where the mine is operated or worked by shaft or slope shall more than ten persons ride in any cage or car at one time," the effect of the amendment being to exempt incline mines from the application of the provision covering the number of persons permitted to ride on a car or cage.

Louisville, Ky.—Kelly C. Cornelius, assistant treasurer of the Liberty Coal and Coke Co., with mines at Straight Creek, Wallshend and Easley, Ky., has opened a new sales office at Room 407 Louisville Trust Building. Mr. Cornelius reports that production will be increased this summer, and that the company is adding to its land holdings in the Straight Creek neighborhood. This company was formerly a part of the old Continental Coal Co., which was disorganized, and the properties taken over by two operating companies, the Knoxville faction operating as the Federal Coal Co. The Liberty company has a large battery of coke ovens, but is not producing any coke at the present time. It now has a daily production of 900 tons, and good selling facilities, making it possible to operate full time. Much of its output is going to Federal cantonments at Camp Jackson, Fort Oglethorpe and Camp Gordon, the latter taking 900 tons daily.

MARKET DEPARTMENT

Weekly Review

Industry Shows Signs of Improvement—Inquiries Being Made for Next Year's Requirements—Bituminous Output Still Decreasing—Prices Maintained—Reasons Why Anthracite Coal Prices Will Not Be Lowered

INDUSTRY is beginning to sit up and take notice. Instead of going to the "demnition bow-wows," as was freely predicted by some cocksure prophets (?) only a few short months ago, Uncle Sam has really turned the corner and before long will be striding rapidly down the wide avenue labeled "Prosperity."

The greatest export business in the history of the United States was done during the month of January. We shipped from our ports in the first month of the present year goods to the value of $623,000,000. This is $57,000,000 better than the export business we did in December of last year and is an increase of $118,000,000 over our foreign business in January, 1918. (Surely this in itself should serve as a refutation of the pessimistic utterances of the calamity howlers!) The steel industry, which is said to be a barometer of business conditions in the country generally, is operating at more than 75 per cent. of capacity. The tin mills are doing even better.

What all this means to the bituminous coal industry is self-evident. Since the signing of the armistice manufacturers in the main have been burning fuel from their stock piles. In spite of curtailments, suspensions, and the shutting down of many industrial plants, a great tonnage of coal was consumed during the past four months. Reserve stocks in the majority of cases are dangerously low, and purchasing agents who have kept out of the market for obvious reasons are now making inquiries. True, there is no pronounced buying movement or contracting activity manifest as yet; but the rippling of the surface shows that the fish are in the depths below, ready to rise to the bait.

Prices of bituminous coal are being maintained firmly, with the exception that off-grade coals are being quoted at considerable reductions to keep them moving and avoid the payment of demurrage charges. It is rumored that there will be a further increase in price of some of the high-grade bituminous coals in the near future. Output is declining, due to half-time operation at most of the mines. This helps to steady the market and really should be a source of worry to consumers with scanty stocks. But as to that, time alone will tell. Only 7,696,000 net tons of soft coal were produced during the week ended Feb. 22, which brings the total output for the coal year to date to 517,479,000 net tons, 23,737,000 net tons in excess of production for the same period last year.

From a number of quarters comes the information that the prices of anthracite coal will surely decline. On what grounds this belief is based it is difficult to see. Nothing, in fact, is more improbable. Not only will the prices of the domestic sizes of hard coal *not* decline, but they are due for an increase. Householders would do well to profit by this warning.

Here are a few of the reasons why the price of the prepared, or domestic, sizes of anthracite will not be lowered: (1) The cost data compiled by the Fuel Administration and recently made public show that 60 per cent. of the anthracite mines were not making any money at the fixed Government maximums. Price control has been removed. These operators, in order to stay in business, will have to raise their prices; otherwise they are faced with the prospect of bankruptcy. (2) To send prepared sizes of anthracite to market it is necessary that the mines screen their coal. Unless the small sizes that result can find a market, the screening of domestic sizes must stop; or else the prepared coal must command a price that will permit of the sale of the small steam sizes in competition with the steam sizes of bituminous coal, which are much cheaper. (3) The present wage agreement in the anthracite field automatically expires with the signing of the peace treaty. The wage scale that would then be in effect is lower than the so-called war scale now ruling. Are the miners going to accept a reduction in wages? (4) The harbor workers at New York are on strike for a shorter workday and an increase in wages. Any of the demands granted will mean an added charge for lighterage and the towage of coal barges. This added cost will be passed on to the consumer.

These are only a few of the signposts that point the way to higher coal prices. It may be that the increase will be postponed until the treaty of peace is actually signed, to enable the operators to refuse any demands for higher wages at this time. But that higher coal prices will come is certain. Every indication points to a raise month by month, as a seasonal differential, until a certain maximum is reached.

WEEKLY COAL PRODUCTION

Bituminous—The production of bituminous coal during the week ended Feb. 22 is estimated at 7,696,000 net tons, and is a slight decrease compared with the week preceding, and a decrease of 3,420,000 net tons compared with the week of Feb. 22, 1918. In previous years the occurrence of Washington's Birthday, like all other holidays, was quite a limiting factor in the production of bituminous coal; but with the lack of demand at this time, the observance of the holiday had practically no effect on the week's output. The average production per working day, estimated at 1,283,000 net tons, not only fell below that of the preceding week and corresponding week of 1918, but also fell considerably below the daily average for the coal year to date, estimated at 1,835,000 net tons, and the daily average for a similar period of last year, estimated at 1,751,000 net tons. For the coal year to date, production of bituminous coal now totals to 517,479,000 net tons and is in excess of the production for the same period of last year by 23,737,000 net tons.

Anthracite—Practically no change occurred in the production of anthracite during the week ended Feb. 22, the output being estimated at 1,113,000 net tons, but 13,000 net tons in excess of the output of the week of Feb. 15. Compared with the corresponding week of 1918, the current week's output is extremely low, falling 741,000 net tons behind. The daily average per working day during the week of Feb. 22 is estimated at 186,000 net tons, as compared with 305,000 net tons during the coal year to date and 316,000 net tons for the same period of 1918. The total production from Apr. 1, 1918, to Feb. 22, 1919, is estimated at 86,020,000 net tons as against 89,238,000 net tons for the period Apr. 1, 1917, to Feb. 22, 1918.

Coal Loading—Reports received from carriers show that the decrease in loading during the week ended Feb. 22 occurred in Alabama and in the central and far western states. Slight increases occurred in all other fields. For the calendar year to date, coal loading is far behind that of last year in all districts, with the exception of Fairmont, where the present year's loading is slightly in excess.

Bituminous Shipments—Shipments of bituminous coal to New England during the week ended Feb. 22 are estimated at 245,231 net tons, and are slightly in excess of shipments during the week preceding. The receipts through the rail gateways during the week are estimated at 102,584 net tons, and are a decrease of 16,456 net tons compared with the week of Feb. 15, while the shipments to New England by tidewater exceeded the tonnage of the preceding week by 20,716 net tons.

Shipments from the North Atlantic harbors and Hampton Roads to all points for the week ended Feb. 22 are estimated at 592,497 net tons, as compared with 526,085 net tons during the week ended Feb. 15. Increases occurred in the shipments from New York, Philadelphia and Hampton Roads, while Baltimore tonnage decreased. At the present time the weekly shipments are but 72 per cent. of the average for the coal year to date.

Beehive Coke—The production of beehive coke in the United States during the week ended Feb. 22 is estimated at 445,700 net tons. This output exceeds that of the week preceding by 24,024 net tons and falls behind the output of the corresponding week of last year by 128,286 net tons. The daily average during the current week is estimated at 74,283 net tons, as compared with 70,279 net tons during the week preceding and 95,664 net tons during the week of Feb. 22, 1918. For the calendar year to date the production of beehive coke is estimated at 3,901,382 net tons, and is a decrease of 145,730 net tons compared with the same period of 1918.

State production figures are now available for the first time, and bring to light the fact that Pennsylvania is the lone state producing beehive coke, for the calendar year to date, in excess of the output for the same period of last year. During the current week, production in all states fell behind that of the same week of 1918. The output of the operators in Pennsylvania, West Virginia, Virginia and Kentucky exceeded that of Feb. 15, while all other states report a decrease.

BUSINESS OPINIONS

Bradstreet's—While the trade and industrial pace is still of a cautious, in some sections, indeed, an even slow, character, evidences of moderate improvement in distribution are now too numerous to be denied. Certain it is that, compared with a month ago, there are fewer poor reports, and a résumé of both wholesale and retail trade, of industrial conditions and of collections reveals the general trend to be rather above than below fair.

Dry Goods Economist—To judge from the number of buyers who have visited the New York market in search of supplies for dry goods and department stores, the business of the country has apparently suffered no reduction. On every hand the report is heard business is good. Labor unrest continues in various fields of industry. The strike of the operatives in New York garment manufacturing plants continues but is no longer considered important. Strikes started this week in shoe factories of New York where operatives have made a demand for an eight-hour day. In other centers nothing of importance has developed to affect the production of textiles.

American Wool and Cotton Reporter—Choice wools, particularly the kind wanted by the worsted mills, are scarce. The woolen mills seem to have more business ahead, and it is intimated that there is a possibility that the worsted mills may also, but not very much is being said about the business of the latter. The great effort being made to cut down the acreage planted to cotton may have some effect, but it never has been of any great importance in the past and it may not be at the present. If any real important result is attained it will seriously affect the wool. The price of cotton will not advance much until conditions change, although there ought not to be any great decline so long as holders are unwilling to dispose of cotton at prices lower than those noted at present.

Dun's—For the waiting policy of buyers, whose potential needs are heavy, the explanation lies chiefly in the price question, but even after many weeks of market defla-

tion, embracing a considerable range of commodities and in some instances of a drastic nature, demand continues hesitant. As a natural outcome of this condition, manufacturing in most lines, and notably in the leading Eastern centers, has receded materially from the extraordinary rate of the war period, and diminution of consumers' purchasing power through elimination of overtime work and increasing unemployment is an influence in retail circles. Yet there are various bright spots apparent, including the strong financial position and the exceptionally light commercial mortality, and sentiment reflects growing optimism as the Spring season, with its promise of enlarging outdoor activities, approaches.

The Iron Age—Current demands for mill products have been larger in the aggregate than commonly appreciated. Those plants which have had to shut down outright or run in alternate weeks have worked off the back log of accumulated orders and others, even where 65 per cent of capacity is engaged, are now almost wholly on new bookings, which keep three to eight weeks' work ahead of the mills. It is those mills which are equipped more particularly to turn out railroad material or are not adapted to supplying the automotive trade which emphasize the light volume of buying. Stocks in hands of producers are low, but distribution has not been affected by manufacturing consumers, notably the agricultural implement makers. Heavy buying is therefore not to be expected in the immediate future from such sources and it is argued that this distribution should not be embarrassed by injecting into it drastic price-cutting questions.

Atlantic Seaboard

BOSTON

Market continues without noticeable change. Inquiry scattering and for small tonnages. Tidewater situation shows no improvement. Uneven prices and lack of buying interest. Higher grades from Pennsylvania held at recent Government figure. Buyers discriminate between grades. Season for legislative "remedies." Room for much adjustment. Water freights easier on certain kinds of barge transportation. Anthracite dull. Only listless demand for domestic sizes. Wide variation in retail prices. Dealers troubled over uncertain outlook.

Bituminous—The present situation in New England has more the characteristics of "midsummer dullness" than any month of March in the history of the trade. All the larger consumers, railroads and other utilities included, continue to have a surfeit of coal on hand, and the much hoped-for "active market" seems as far away as ever. There are no significant developments; things just keep mulling on with light traffic and minimum consumption in almost every direction. Only small inroads are being made in the heavy stocks accumulated under the stress of war emergency, and the movement both all-rail and by water is still in very small volume. The shippers have become reconciled to meager business and buyers are still being canvassed closely, although quotations are now on a better established basis than was the case a month ago. There is still no railroad policy with respect to new purchases, and naturally there is apparent among the roads in this territory a distinct effort to reduce their fuel reserves, before undertaking anything like comprehensive buying.

Among small buyers there is now a scattering demand, but it takes careful combing to uncover it. It is almost wholly confined to those whose storage was small or those who were unable last fall to get forward what was required for early spring consumption. The aggregate of these small current purchases is considerable, and when added to shipments coming forward on contract accounts for the present all-rail movement which, in proportion, is in much better volume than are deliveries by water. With the present wide differential in favor of rail shipment it is plain that deliveries inland from tidewater rehandling plants are being held down to an absolute minimum.

Little is heard as to contracts. One or two of the Hampton Roads factors have had some success in tying up a certain tonnage on a mine price "plus" basis, but when entered into either by consumers or retail dealers such arrangements are usually based upon good service in recent years rather than upon any commercial advantage as yet disclosed. The current market shows no improvement whatever, and there are still cargoes of "distress coal," overshipments on old contracts, etc., to be absorbed by an already overstocked market. Frequently there are instances where cargoes shipped in exact compliance with contract are obliged to wait discharge until current consumption makes room for the coal to be added to storage. Scores of mines are idle in the smokeless districts, and there are few agencies that are not under embargo because of failure to dump at Hampton Roads piers the accumulations now standing to their order.

Producers of the better grades from Pennsylvania show every intention of holding to the recent Government price level of $2.95 per net ton, except in a few cases where the coal is held at figures slightly higher. Many of the operations are down to 25 per cent. or even 10 per cent. of normal output, but there have been fewer instances lately of any shading in prices, except on inferior grades; $2.15@2.40 per net ton is still the range on some of the higher volatiles.

Certainly there is every indication that when comprehensive buying does start in there will be a good deal of discrimination between the grades offering. Large tonnages that were placed here last year through Fuel Administration channels were of inferior grades and the experience is lasting so long that buyers have become well schooled in the disadvantages of poor quality. It is this deep-rooted feeling on the part of so many buyers that makes it possible for a considerable tonnage of Pocahontas and New River to be absorbed on contracts in the face of the much lower quotations that are made on certain Pennsylvania coals that are offered for all-rail shipment.

While the United States Shipping Board has in no wise modified the mandatory rate on requisitioned steamers, there are abundant signs of weakening in such water rates as are not regulated through any Government channel. On Long Island Sound there is now a large surplus of barges and rates have receded very nearly $1 a ton from those recommended a short three months ago. In other words, freights from New York to points like Fall River and New Bedford are $1.10@1.25, instead of $2@2.15. Meanwhile, railroad-owned barges are being held at $1.75 on anthracite between the same ports, and no sign of change. Of course, the few buyers who are taking coal are using outside privately owned transportation.

Anthracite—Retail dealers are having difficulty in shutting off shipments, and one result is a generally overstocked market. The exceptional winter has made a big difference in winter deliveries and the system of anthracite "applications" devised by the fuel authorities only added to the generally mistaken estimates that were made early in the season. Domestic sizes are only in listless demand. A few retailers are quietly accepting what deliveries are made them, partly on the ground that prices will not be reduced, but these are in the minority. Most of the dealers along the coast are expecting at least a reduction in water freights and there will be no active spring buying until the outlook is somewhat clearer and less uncertain than at present.

There is a noticeably uneven retail price line throughout New England, not always following the differences in cost. The range is from $11 in Boston to $14 in Lewiston, Me., and there are similar wide variations within relatively short distances. Naturally the public finds it difficult to reconcile such figures and it is hoped that many needed adjustments can soon be made.

NEW YORK

Consumers await operators' announcement regarding summer prices. Usual reduction will mean good business. Demand for domestic coals contiues slow. Tidewater dumpings show decrease. Anthracite steam coals stronger. Bituminous market shows improvement. Embargoes are declared off and docks are well cleared of surplus. Troubles reported in New River and Pocahontas fields.

Anthracite—In addition to small consumption the failure of the coal producing interests to make public their intentions as to what might be expected by consumers on Apr. 1 in regard to prices is having its effect upon the situation. The question of spring and summer prices is one of paramount interest to all users of hard coal, but particularly to New Yorkers. Many who heat their own homes like to know that their next winter's fuel is safely stored away in the cellar before they leave the city for the summer. Failure of the operators to make a reduction in the present prices will likely result in a comparatively small wholesale and retail trade here during the summer, many householders believing they might as well wait until the fall and take chances of getting coal.

It was expected that some announcement might be forthcoming from the operators after their meeting in Philadelphia on Friday last (Feb. 28), but it is understood that no conclusion was arrived at by those in attendance.

The demand for domestic sizes continues to be small, but a better situation exists in the steam coal market, due to the suspension of operations at the mines, resulting in a smaller production of buckwheat, rice and barley coals.

If production is maintained on practically the same basis as it was during the month just closed, the situation will be in a comparatively easy condition on Apr. 1. There is a slow but steady call on the retail trade and just about enough to enable the dealers to begin the coal year with ordinary stocks. Just now no dealer is willing to take in more than he is likely to require with the spring situation uncertain.

Reports of cars dumped during the week and month ending Feb. 28 show a big slump. In the first instance there were 2962 cars emptied as compared with 3732 cars the previous week, a decrease of 770 cars. For the entire month there were 15,137 cars dumped as against 23,756 cars during January, a decrease of 8619 cars.

Wholesale dealers report little business coming from Canada. Stocks are reported as large, and there is little demand. Heavy stocks are also reported in the West and inquiries for business bring the information that only real bargains will be considered.

There is little doing here with regard to the domestic coals. The companies are maintaining their regular schedule of prices while so-called independent coals have been held at 20c. below. Pea coal moves slowly and quotations range from $4.65 to $4.80 at the mine.

There is a stronger feeling in the anthracite steam coals, owing to the slow production. Buckwheat No. 1 was quoted at from $2.75 to $3.25 at the mines; rice from $2.35 to $2.40, and barley from $1.50 to $1.80, all for the better grades. Inferior coals were, it was said, being quoted at about 30c. lower, principally for loaded boats.

The local anthracite situation is not very encouraging. There is some chestnut, stove and egg moving in, but this is nearly all going into storage. The domestic demand is light. The country business on chestnut is fairly good.

It is generally understood here that effective the first of April there will be an increase in the price of anthracite coal.

Bituminous—The situation shows much improvement. The docks are in much better shape and there is not a large amount of surplus coal on hand. There has been a much heavier demand for bituminous than for anthracite, as is noticeable in the report of the Regional Director of Railroads of cars dumped during the week ended Feb. 28. The reports show that 5017 cars were turned over as against 6248 cars the week previous, a decrease of 1231 cars. For the month of February there were 23,668 cars dumped as against 23,769 cars in January, a decrease of 101 cars.

Wholesale dealers report a much better condition of affairs, but there is said to be some coal which has been offered much below the Government maximum in order to save demurrage charges. Even at that it is not always an easy matter to dispose of it, most consumers having large stocks in their yards and no desire to add to them.

It is not expected that many shippers will take advantage of the Fuel Administration order and do business independently of the Tidewater Coal Exchange.

Western sales agents writing to local houses say there is abundant coal in the West and that demand is slow with no prospects of better business for several weeks.

There is a strong feeling that operators in the New River and Pocahontas fields are facing labor trouble which may resolve itself into a suspension of operations, or possibly a strike, by Apr. 1. Reports received here are that some producers have sub-leased storage plants and are storing coal in anticipation of trouble. Coupled with this report was another to the effect that prices for these two grades of coal would soon be boosted, probably as much as 75c.

Locally conditions are much stronger. There is not so much free coal around and not so many loaded boats. Distributors are not sending their product to Tidewater unless there is a buyer in sight, and this helps conditions considerably.

Consumers who buy all-rail coal are particular now as to what grade is sent them and are paying nearly the Government maximum.

Quotations at Tidewater vary greatly, much depending upon the pool wanted. Coals in Pool No. 9 were being quoted the early part of the week at from $5.85 to $6, and from Pool No. 10 at from $5.35 to $5.50.

PHILADELPHIA

Anthracite trade unsatisfactory. No real improvement in sight for a month. Buying both wholesale and retail at low ebb. Some individual price-cutting. Mines on half-time, with production difficult to move. Some slowing up of accounts. Retailers getting ready for spring trade. Retail price-cutters more active. Mine labor restless. Stove and nut in chief demand. Steam coal quiet, with fair outlook for future. Bituminous still draggy. Prices fairly well maintained. Good bunker business.

Anthracite—Philadelphia coal dealers are a disgruntled lot and are gradually losing respect for their business. The month of February was such a distinct disappointment that they have little hope of any improvement during March, and indeed some of them say they do not even look for normal conditions before next fall. The representative dealers show much concern for the future, as they claim that unless some drastic action is taken to force the public to believe that there can be no sharp decline in prices there will be all kinds of trouble next fall and winter. Many householders appear to believe that prices will be lowered several dollars a ton, and we have recently actually heard the dealers called upon to deliver in one-half-ton lots.

The individuals are cutting prices; there is no doubt about that, but it is difficult to judge just how low they will quote. Often a shipper has coal standing at the scales on demurrage and after several days is forced to let go at a ridiculous price. The dealer who buys it will sometimes try to drive a bargain with another operator and quote this price. Such sales form false impressions and of course should not be taken as a basis for estimating current conditions.

We have heard some strange names for coal lately, and it is just possible that some of the smaller houses are for the time being renaming their collieries when making these low prices for quick sales in order to avoid cheapening the reputation of their product. Every house has every available man on the street, and some of them seem to be adopting the method of calling by telephone every possible prospect two and three times a week. Notwithstanding all this effort it must be admitted that sales are few and not substantial. It is with difficulty that the most reputable mines can be worked more than three days a week. One famous coal that for years has been sold at a premium has this week been freely offered at company circular.

As to payments the companies are not complaining about their accounts, but feel they are no longer to enjoy the prompt payments of last year. They claim it is noticeable that the January balances are larger than for many months. Like the retailer, if the shipper forces sales, he soon finds he has a list of slow accounts.

In the suburban districts where the houses are larger and the people more affluent business usually holds up better than in the city proper. Here we also found the dealers complaining and delivering little coal. They, too, are laying off men and selling horses to reduce expenses.

Another price-cutter appeared in the retail trade this week much to the disgust of the representative dealers who have so earnestly tried to influence their competitors to maintain their full rates based on the $2.50 margin allowed when Mr. Lewis local administrator, was in office. The lowest rates now being advertised are egg, $10; stove, $10.25; chestnut, $10.25; pea, $8.25. This is a reduction from the standard prices of 30c. on egg, 35c. on stove, 40c. on chestnut and 80c. on pea.

Some of the larger dealers are considering seeking legislation to reduce the weight of a ton of anthracite in this state from 2240 lb. to 2000 lb. As the legislature is now in session there is no doubt that a bill will be presented. The dealers claim that with the gross ton for anthracite in this State they are placed at a disadvantage when prices are compared with sales in states on the 2000-lb. ton.

Many reports are heard from the mining region about the discontent among the miners because of the short working time. At a recent meeting of union men in the region the statement was made and printed in the newspapers that the operators were cutting down the working time simply to uphold the prices. Of course any one connected with the trade knows how ridiculous a statement this is. One local even went so far as to petition Congress to take over the mines and work them full time. There can be no denying that mine labor is extremely restless, and it is reported that the operators have held a meeting to consider this phase of the situation.

Shippers report the sales of the past week to have been confined chiefly to stove and chestnut. A light tonnage of egg is coming here and practically no pea coal, as some dealers have enough of this latter size to run them for several months; while the average retailer has more than he ever had at this time of the year. The demand upon the dealers for this size appears to be over for the season, although it is thought March may bring business in small lots to finish out the month.

The steam coal prices do not seem to indicate it, but report has it that the small sizes are due for a brace. Stocks are being cleaned up to some extent and some industrial plants which had coal stored, it is expected, will again be in the market before long. Upon inquiry we hear of buckwheat for $2.60 to $2.75, on up to company circular of $3.40. Rice is around $2 and barley dragging along around $1.25.

Bituminous—There is no marked change in the soft-coal situation. All operators continue to work on reduced time and seem simply to be in a waiting mood for the better times which are forecasted. Shippers almost generally insist upon the full price for the good coals, and while some grades can be purchased off price, the sales are not such as to break down the market for the good coals.

At tide there is fair business, especially in bunkering, which is calling for the very best grades. Recently we heard of quite a piece of business for bunker fuel closed at a good figure.

BALTIMORE

Export movement fails to respond in way that December shipments had promised. Soft-coal market over-supplied, but steadier under sale reservations. Hard coal selling lacks interest.

Bituminous—A disappointing feature of the present market, when the supply of soft coal so far exceeds the demand, is the failure of the export trade to materialize. After the first eleven months of 1918 had seen a movement of less than 7000 tons per month for foreign account, December saw a jump and more than 30,000 tons was loaded for foreign delivery. Lack of bottoms, labor disturbances at consuming points, freight rates, etc., however, caused a halt and the January and February movement has been a disappointment to those who had hoped for a decided revival. The foreign bunker business, which during 1918 averaged around 20,000 tons per month, is holding up fairly well, however.

While the run of soft coal to the piers and other points in this district is still in excess of urgent needs, a steadying influence has entered the trading. A producing company handling specialized coal the past week let it be known that none of the particular product would be released below $3.20 net, or about 45c. above the old Government maximum. This news at once strengthened a number of other better coals. Even where there was over-supply here the better fuels were being held pretty firmly at the old Government maximum. Poor coals and gas coals, however, continued to sell much off those figures. The shipment of some coals outside the pool here has begun, although the greater amount of movement is still through the Tidewater Exchange and likely to remain in that channel. The end of the no-reconsignment order also proved pleasing to the trade here.

Anthracite—Little interest is manifested here in the hard coal market. The mild weather still holds and buying keeps up only in ton and half-ton lots for the most part. The main feature of interest to the trade the past week was a banquet given by the retail exchange to the Maryland Fuel Administrator, Ferdinand A. Meyer, and his staff, at the Southern Hotel, on the evening before their official termination of duties with the Fuel Administration, Mar. 1. The first real awakening of interest here will come with the discussion of possible spring schedules—if there turns out to be such a "beastie."

Lake Markets

PITTSBURGH

Stocks still in evidence. Hardly any buying. Production 25 to 30 per cent. of capacity.

Stocks of coal in the hands of consumers have not decreased enough to bring any additional demand into the market, and in consequence the market remains extremely dormant. Shipments of coal are at 25 to 30 per cent. of the mine capacity in the district, and are confined almost entirely to quantity. Less coal is being forced on the market through being loaded and having to be sold at almost any price to avoid demurrage charges, and in this respect the market is on a firmer basis than formerly.

The byproduct coke ovens are operating fairly well and are consuming almost as much coal as formerly. The steel mill consumption of coal is somewhat less, but it is still at a very good rate. Production of steel is at 15 to 20 per cent. less than at the maximum, late last fall. From the coal standpoint the chief difficulty about the steel industry is that it is using up stocks. Railroad consumption of coal is distinctly less. Outlook for the lake shipping season is not particularly good and it seems probable that shipments will be light early in the season, though by midsummer they may be at full rate.

There has been no negotiating as to contracts for the lake season, buyers preferring to hold off. Operators are equally in a waiting mood as to all classes of sales and show no disposition to force an issue. From present appearances it is quite within reason to expect that coal prices will be fairly well maintained, sellers merely waiting until buyers are willing to pay the price. The market at the moment is not closely quotable, as the grade of coal has so much influence upon prices. Generally speaking the market, outside of odd lots of demurrage coal, may be quoted at $2.25@2.35 for mine-run steam coal and at $2.50@2.70 for ¾-in. gas coal, per net ton at mine, Pittsburgh district.

BUFFALO

Little change in the situation. Bituminous possibly a trifle stronger. Trade hopeful, but nothing certain. Mines running at a slow rate. Anthracite accumulating.

Bituminous—Demand is still light, but stocks are running down and more will have to be bought before long or the industries will suffer. It is an odd situation. The consumers of all sorts of goods are waiting for prices to come down, while the producer and labor are engaged in holding them up. Not much can be done till this struggle is over.

Jobbers do not see any trade for them right away. They are waiting about as they were with just trade enough to keep them from utter despair. They do not fear complete annihilation, as some of them did when the Government fuel administrator was after them, for some day normal conditions will come back and then they will be wanted. They have won one battle in the dropping of the rule not to reconsign cars, but the benefit will not be evident right away. As a section Buffalo is apparently faring about as others are. It is a waiting market and must remain so till the industries move normally.

Former bituminous prices are held pretty tenaciously. A few cut prices are reported, but they do not affect trade much, quotations remaining at $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.20 for same, mine-run and slack; $5.60 for smithing and smokeless; $5.60 to $6.10 for cannel; all per net ton, f. o. b. Buffalo.

Anthracite—The coal is accumulating here quite rapidly. Some companies are managing to hold it somewhere else, others are either seeing it stand in cars or are putting it into stock piles. In any case the outlook is not pleasing. The spring is coming on, when the consumption is sure to be small, and then a long summer with little buying; for the consumer is not frightened any longer and still hopes to see prices return to former figures, though it does not look as though he would see lower prices right away.

Some shippers are saying that the logical thing is to put a lot of this coal afloat here, but nothing is done about it. A while ago there was tonnage asked for, but it was not taken and the prospect of any being loaded right away is not good. Shippers appear to be afraid that it will be moved west before any is needed there and the yards there be loaded full of it. The situation is one that could not have been thought possible till quite lately, for it has come to be the belief generally that anthracite would never be plentiful again.

CLEVELAND

Decidedly more snap is being shown by both the steam coal and domestic markets. For the former, depletion of stockpiles is given credit; for the latter, cold weather. The outstanding development is the report that at their meeting at Indianapolis, Mar. 18, the United Mine Workers will propose that the present wage scale be continued for two years.

Bituminous.—Not in months have local operators been stirred by anything as by the report that the United Mine Workers, when they meet at Indianapolis Mar. 18, will propose that the wage scale now in effect be continued for two years. In addition to furnishing a choice morsel for discussion, it has helped stiffen the market and prompted more predictions that No. 8 coal prices will continue at or close to their present level for some time. Operators are by no means unanimous in their views. Some believe that so long as commodity prices remain high, it will be the part of policy to keep wages up. These operators hold to the view that the public foots the bill, in any event, and that greater efficiency and harmony can be attained by maintaining the scale. Other operators are flatly against the present scale, and are insistent that it must be reduced.

Although operations at the mines have not been accelerated, the market, especially for steam coal, is broadening. In some instances the bottoms of stock piles are beginning to show. In other cases, users with fair-sized stocks still on hand are beginning to buy. A great deal of buying that was delayed because of a belief lower prices were inevitable is beginning to be revived. Many operators profess to believe the tide has turned and that the market will consistently become brighter. Hopes for an export outlet for coal all have faded, and this causes considerable disappointment.

The combination of real winter weather and a plentiful supply of much-sought Pocahontas has stimulated domestic demand for bituminous to the highest point of the winter so far. All hopes of doing a winter business have been abandoned, however, and any improvement is only relative. Dealers are getting $7.50 for Pocahontas lump and $7.20 for run-of-mine, and report a fair business at these prices. Retail dealers continue to receive numerous offers of second grade and off coal, but the coming of Pocahontas and the still ample supply of anthracite have pushed bituminous out of the running.

Anthracite—Receipts continue equal to demand, but are lower than a week ago. Pocahontas users are leaving substitute anthracite in the lurch, now that their favorite is obtainable. The delivered quotation continues $10.85.

Lake Trade—Loading machines at Lake Erie docks are being overhauled preparatory to the beginning of the season. Early cargoes are not being sought with much vigor, for dock piles at the head of the lake still are the largest in years—for this period of the year. In the absence of a new price last season's will hold over. The entire lake situation hinges upon the decision of the United States Railroad Administration on the request of lake shippers that demurrage rules be modified in order to permit abandonment of the pool and resumption of private shipping.

DETROIT

Because of the large stocks of bituminous remaining in retail dealers' yards and at many manufacturing plants, the Detroit market is inactive.

Bituminous—Withholding of orders by consumers of steam coal and retail dealers is still accompanied by the explanation they already have more stock on hand than they feel is justifiable, according to Detroit jobbers, who find business is unusually light for this period of the year. Large users of steam coal, who usually have been arranging contracts at this time in previous years, either have stocks sufficient to meet their requirements for some weeks to come or have decided the present is an inopportune time to take on new commitments.

Jobbers find some of the industrial consumers are buying only for current pressing needs and seem to be looking for a reduction in coal prices about April 1. Efforts to convince these customers that they are likely to be disappointed are not altogether successful, though the jobbers argue that with the present high wages of miners and unusual additions to operating costs, the producers are more likely to advance than to lower the price now in effect.

On most of the business that is being done the jobbers say the fuel administration scale of prices is being observed. Some exceptions have been reported, however, where coal on tracks was accumulating demurrage or was not of a type sought by buyers.

Retail dealers are expecting an improvement in demand from domestic buyers to follow the drop in temperature that marks the passing of February. So short a time remains before warm weather may be expected to return that the belated buying is unlikely to relieve the retailers of the necessity of carrying burdensome stocks of bituminous over into the summer.

Anthracite—With all restrictions on use of anthracite for domestic purposes now removed, the larger proportion of inquiry from householders is for anthracite or coke. Dealers appear able to supply either in reasonable amount, although receipts of anthracite are still of small volume. Intimations are given that an increase in price of prepared sizes of anthracite, amounting to 50 to 75c. a ton, may be expected in the near future and that the reduced price usually in effect after Apr. 1 to facilitate early distribution is unlikely to materialize this year.

COLUMBUS

The coal trade has been rather quiet during the past week. A short cold spell stimulated domestic buying, but it was short-lived and the weather is again exceedingly warm. Steam buying is not active, although inquiries are more numerous.

The coal trade in Ohio has continued quiet in all regards. The expected cold wave predicted by the weather bureau arrived, but the temperature was not a great deal lower and it was soon followed by the unseasonable weather that has prevailed all winter. Consequently, the domestic trade is still quiet and continues to be a weather proposition pure and simple. Retail stocks are large and there is no disposition to increase them under present conditions. There is still some demand for Pocahontas and other fancy grades, but the tonnage moving in this territory is not large. Retail prices are still generally maintained, although some cases of price cutting are reported. Household stocks are still large and many consumers will carry over a considerable tonnage until next year.

Steam trade is quiet in most localities. Traveling salesmen and jobbers report a better disposition on the part of purchasing agents to talk fuel, which is taken as a good indication. In other words, one can get the attention of purchasing agents to discuss the fuel proposition where it was almost impossible to get them to do so several months ago. Iron and steel plants are still well stocked and the same is true of rubber factories. Some of the manufacturing plants are slowly getting on a peace basis and are in the market for fuel. But orders are still scarce and are hard to land. Quite a few contracts expire around April 1 and there is some speculation as to what the new contract price will be. All the old steam contracts in this territory carry the Government figures. Some predict that shading will take place, while others believe the price will be maintained generally.

Production is still slow, as is inevitable under present conditions. Some railroad fuel is being mined, but railroads are not using as much as formerly. Steam plants, especially public service concerns, are taking a fair tonnage. It is estimated that the output in the Hocking Valley is about 25 to 30 per cent. and the same figures are reported from Cambridge and Crooksville fields. Pomeroy Bend is credited with 35 per cent. output. The eastern Ohio field is curtailed to about 30 per cent. production.

CINCINNATI

Mild and rainy weather has again reduced consumption. Production is being decreased to meet the situation, pending completion of marketing plans.

The coal trade as a whole is in the throes of readjustment to peace conditions, and to an extraordinary winter, which, after occasional hints of some real wintry weather, always turns again to mildness. This makes the need and the demand for coal very small as compared with the available supply. During the past week mild and rainy weather has prevailed, and consumers of all classes, seeing their stocks still adequate, and with prospects of an early spring, have naturally refrained from further buying. Deliveries of coal on contracts, therefore, have more than taken care of the needs of industrial consumers, as heretofore.

It is fully apparent to the trade, aside from the conditions brought about by heavy storage of coal last summer and a mild winter, that the process of getting back to a basis of normal consumption is still to be worked out, and that the present situation is playing its part in that work. In other words, it is pointed out by clear-sighted coal men that operations brought into activity purely by war business are suffering most by the present lack of demand, and that eventually mines which are without economic justification under normal conditions will have to be eliminated, as far as the ordinary run of business is concerned. This process, it is admitted, is painful, but it is also admitted that it is necessary, unless there are some means found of maintaining the country's industrial machine at the high mark of activity forced by the war, which it hardly considered possible, or at least, probable, just now.

LOUISVILLE

Steam continues inactive, with domestic in fair demand only. Prospects for steam slightly better. Coal operators believe that summer stocking will be light unless steam improves.

There has been no material change in the general situation in the Kentucky fields during the month. Mar. 1 finds the situation about the same as on Feb. 1. Steam coal is draggy, and some operators have been forced to ship steam without orders so as to get it out of the way in order to produce domestic, for which there is a fair demand.

Retail demand shows some slight improvement due to a few cold snaps and the fact that many consumers are beginning to run low on winter stocks, resulting in a fair demand for small lots.

It is believed that steam coal will be in much better demand by Apr. 1, due to the fact that many stocks are beginning to peter out, that some industries, especially the automobile industry, are again busy. Gas plants, public utilities, etc., are taking a fair quantity of coal.

Many operators are of the opinion that even if domestic consumers desire to stock during the coming summer period the retailers will have trouble in securing domestic sizes, unless they stock resulting steam grades. Many operators are now making their domestic sell their steam where possible.

The demand for low grade coals is light, and many of the eastern Kentucky producers of poor grades are at a standstill. The wagon mines are generally down. The larger mines are operating two to thsee days, whereas a few minei with good contracts are managing to keep busy almost full time. Production for the state, however, is figured at about 45 to 50 per cent. normal. Western Kentucky is producing on about the same schedule, but is having trouble in keeping up a demand for low grades.

Prices are holding fairly well, although about 25 per cent. of the operators are cutting somewhat in order to secure business. Domestic is firm, and on new business operators are holding for premiums of 15 to 25c. a ton, but generally supply old customers at Government prices. All grades under 4-in. are hard to sell, and are carrying a cut of from 20 to 75c. in some cases. Straight mine-run is about 25c. a ton off. Screenings represent the hardest problem at this time.

Retailers are generally carrying short stocks, and buying as needed, not carrying more than a few cars of coal on hand at the most, as deliveries can be had on short notice. It is now believed that a good deal of river coal will come in during the summer stocking season, and already a little coal is coming down, while it is reported that a good deal of coal is being loaded at upper Ohio River points.

Coke

CONNELLSVILLE

Less demurrage coke but regular make offered at lower figures. March adjustments in progress.

The furnace coke market is distinctly steadier in the respect that there is now little demurrage coke being offered at any price it will bring, but on the other hand some operators are willing to accept lower prices on regular orders. Thus while there is hardly any coke to be picked up at extremely low prices it is possible to buy coke, still to be made, at lower prices than formerly. Several leading operators are holding $5 strictly as minimum for furnace coke, but a few at least would sell down to $4.50, either a small lot or a run of a fortnight or a month. Regular brands of foundry coke are held fairly well at $6, but there is some shading of this figure. The spot and prompt market is quotable at $4.50@5 for furnace and at $5.50@6 for foundry, per net ton at ovens.

Negotiations are in progress to settle prices at which coke is to be invoiced during March under contracts calling for a negotiation when there is no Government price to control. It is not improbable that these adjustments will be made in most cases at $4.50, though some operators are trying to obtain more. In some instances the operator owes the buyer something

through the adjusted price for February having proved too high to be representative of the market. In some instances this fact was recognized by an extra adjustment in February. A case is cited, for instance, in which the parties agreed upon $5.50 for February, but the market soon proved so much lower that the operator made a concession covering shipments during the second half of the month such that the average for the whole month was made $4.75. Another illustration of market conditions is that one interest which controls both coke works and blast furnaces is billing the coke at $4.50, regarding that figure as fairly representative of the market.

The "Courier" reports production in the Connellsville and Lower Connellsville regions in the week ended Feb. 22 at 233,612 tons, an increase of 33,256 tons. The merchant oven production of 82,490 tons, however, showed a decrease of 3646 tons.

Buffalo—The situation does not look so bright as it did, for the amount of iron ore on the docks is heavier than for a long time and it is going to affect the summer movement of it seriously. The furnaces are not running strong and the demand for coke is less and less. Prices are weak. This market reports that what is needed can be had at about a dollar less than the former Government prices, and that anything of less value than 72-hour foundry is selling at terribly low prices, so low that quotations are hardly possible. Fuel coke is as dull as bituminous coal and will have to continue along with it.

Middle Western

GENERAL REVIEW

Labor difficulties at the mines would lead to coal scarcity. Steam market is dull. No contracting in evidence. Brisk demand for domestic coal.

Coal men are wondering what effect the tremendous decrease in the production of coal will have on the country. The rapid falling off in production since Jan. 1 is worthy of a lot of thought, especially on the part of the purchasing agents who buy large quantities of coal. If production is kept at its present low level, soon there will be a shortage of coal, even taking into consideration the fact that there are still some big storage piles throughout the country. Should any serious labor difficulties arise around Apr. 1, and such a situation is not at all improbable, it would find some of our most important industries practically without coal. In times as unsettled as the present the wise purchasing agent will have at least one to two months' supply of coal on hand.

The steam market is dull, if possible even as dull as last week. The bids made for the Camp Grant business have all been refused, and it is understood that Camp Grant will buy on the open market, for the time being. The big buyers are purchasing a little coal, but not enough to have much effect on current conditions.

Usually at this time of the year the coal man is exerting all his energies toward getting contracts, but this year to date but few new contracts have been made. Those agreements that have been made were entered into on a basis of Government price last in effect. The coal operator is not over-anxious to contract at the present low figures, because he believes that better times are coming. The purchasing agent is not very eager to contract because he thinks that within a short time the market will be demoralized, and operators will jump at any business on any terms. Personally, the writer believes that from the standpoint of the buyer, now is the time to contract.

The railroad fuel situation at this writing does not appear to be any nearer a solution than it was six or eight weeks ago, and criticisms of those to blame for this condition are becoming louder and more pointed from day to day. Coal operators think that somewhere they may have friends, but at all events they are not in Washington.

There has been, considering the past, a brisk demand for domestic coal throughout the Middle West. Most dealers had but limited stocking space, and it appears that what storage of domestic fuel there was in the territory has been absorbed.

Prices continue firm, both on steam and domestic. The operators are showing the public they have no wish to return to the old days of selling their product a little cheaper than their competitors.

CHICAGO

Colder weather stimulates steam and domestic demand. Not as much Eastern coal coming in as was expected. Anthracite moves slowly.

Chicago is enjoying a cold snap; that is, the coal producers are enjoying it. The result of the near zero weather we have been having for the last few days is a decided quickening of the trade, both steam and domestic. During an ordinary winter, times like the present would be considered very dull, but under existing conditions, the coal trade is very grateful.

Some Eastern coal is coming into Chicago and its suburbs, but not merely so much as was expected. The retail trade apparently like Mid-Western coal, and are refusing to go back to the more expensive coals from West Virginia, Ohio, etc. Anthracite continues to move slowly, although sales agencies are combing the territory for orders.

MILWAUKEE

Price-cutting by Illinois operators causes a nervous feeling among holders of large stocks of soft coal. Efforts being made to ward off a general decline in bituminous. A weather market.

Shading in prices by several Illinois operators is causing uneasiness in the Milwaukee market, and holders of bituminous coal are conferring with each other and doing what they can to avert a general decline in the soft-coal schedule. With spring at hand, and operators well stocked, there is no telling when this will occur. The situation is unquestionably dubious.

Retail prices on all grades of coal and coke have been firmly maintained thus far.

Bituminous stocks are heavy for the season, but the anthracite which was received by lake is nearly gone. This grade of coal is coming in freely by rail, however, and there is no trouble in supplying the demand. There are more users of soft coal in Milwaukee than ever before, and should anthracite continue at anything like present prices next season there is no doubt that many will continue to use the soft varieties.

Coal is moving out more freely from the yards, both by wagon and rail, because of a spell of cold weather; but the season is too far advanced to expect zero weather to remain very long.

It is certain that there will be a large amount of soft coal on the docks when the lake shipping season opens.

ST. LOUIS

Heavy market continues on all sizes from all fields with practically no demand for anything. Weather trifle colder than it has been, but nothing to warrant any decided changes in local conditions.

A heavy market with no changes of any kind is the local situation. The latter part of the week there was colder weather, but this was not enough to cause any unusual demand for coal, either steam or domestic. There were some small orders for domestic use and the wagon-load steam business responded slightly, but other than that there was no improvement.

Country business picked up a little on domestic sizes on the strength of a cold wave, but it was not anything to bring about any change in prices or create any shortage.

In the Standard district there still continues to be a surplus of steam sizes and at some mines a surplus of domestic sizes, with mines working one or two days a week. Occasionally some of them get three days.

The railroad tonnage is extremely light, but it is a factor at this time in keeping some of the mines going that would otherwise be idle.

The Mt. Olive field, which is putting in practically no coal in the St. Louis market, is doing exceptionally well on outside business in the northwest and Chicago.

It is understood that one of the last acts of the local fuel committee will be a letter eliminating the classifications made in the early part of the Fuel Administration pertaining to Illinois coals in the St. Louis market. This will help the Mt. Olive district considerably.

The present prices, which are below the cost of production, cannot continue for any great length of time without causing final disaster to some of the operators.

In the Carterville field of Williamson and Franklin Counties, as well as in the Duquoin field, there is a scarcity of orders for both steam and domestic sizes. All of the operating companies have the territory combed pretty closely now with the salesmen, but that does not seem to get the business in sufficient volume.

The Government prices in these fields are being maintained, excepting in Williamson County, where the independent operators are selling at $2.55 and below for domestic sizes. In the Mt. Olive field the Government price is being maintained, while the Standard field shows a continued weakness.

The local anthracite situation is not very encouraging. There is some chestnut, stove and egg moving in, but this is nearly all going into storage. The domestic demand is light.

Statistics furnished by the Tidewater Coal Exchange show that the situation has greatly improved, and on its recommendation all embargoes on coal consigned to all piers in the New York harbor have been removed.

The prevailing market, with the exceptions as noted above, is as follows:

		Mt. Olive and Staunton	Standard
Franklin County			
Prepared sizes, lump, egg, Nos. 1 and 2 nut	$2.75	.....	.....
Williamson County			
Prepared sizes, lump, egg, nut	$2.55	$2.55	$1.75 up
Mine run	2.20	2.20	1.65@1.75
Screenings	2.05	2.05	1.00

Williamson-Franklin rate to St. Louis is $1.10; other rates 92½c.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Mar. 2, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	142	145
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	38⅜	38⅞
Colorado Fuel & Iron, Pfd	(CF)	99	....
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	25	29
Elk Horn Coal, Pfd	(EH)	....	47
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	46¾	47
Pittsburgh Coal, Pfd	(PC)	85½	86
Pond Creek Coal	(PD)	13¾	14
Virginia Iron, Coal & Coke	(VK)	55	60

*Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	71	....
Colorado Fuel & Iron, Gen. 5s, 1943	88	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	73¼	75
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	91
Grand River Coal & Coke, 1st 6s, 1919	....	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96½	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	97½	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79¾	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s. Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80¼	....
Pocahontas Coal & Coke, Joint 4s, 1941	84	85½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87⅜	90
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	81¼	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92	95¼
Utah Fuel, 1st Sinking Fund, 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	51⅓	70
Virginia Iron, Coal & Coke 1st 5s, 1949	87⅛	89⅜